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# 1000 QUESTIONS IN GENERAL KNOWLEDGE



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# 1000 QUESTIONS IN GENERAL KNOWLEDGE

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## INTRODUCTORY NOTE

This volume is divided into fifty sections, each comprising twenty questions and answers upon some specific branch of general knowledge. The questions are printed in darker type.

# CONTENTS

	PAGE
AIRCRAFT . . . . .	1
AIR AND VENTILATION . . . . .	6
ARCHITECTURE . . . . .	11
ATHLETICS . . . . .	16
BANKING, MONEY . . . . .	21
BIRD AND ANIMAL LIFE . . . . .	26
CARDINAL POINTS, HEAVENLY BODIES . . . . .	31
CLIMATE, WEATHER . . . . .	37
COAL MINE . . . . .	42
THE COUNTRY . . . . .	47
DOCKS AND SHIPPING . . . . .	52
DRESS . . . . .	58
THE FARM . . . . .	63
FIRST AID . . . . .	68
FLAGS, BADGES . . . . .	73
FOOD . . . . .	80
FORMS OF ADDRESS, ETIQUETTE . . . . .	85
THE GARDEN . . . . .	90
HEALTH, HOUSING . . . . .	95
THE HOME . . . . .	100
THE HUMAN BODY . . . . .	105
THE LAW AND LAW COURTS . . . . .	110
LITERATURE . . . . .	115
LOCAL GOVERNMENT . . . . .	120
MANNERS, CUSTOMS . . . . .	125

# CONTENTS

	PAGE
MARKET, TRADE . . . . .	130
MEANS OF COMMUNICATION . . . . .	135
MOTORS AND BICYCLES . . . . .	140
MUSIC . . . . .	145
PAINTING, ART . . . . .	150
PARLIAMENT . . . . .	155
PERSONAL HYGIENE . . . . .	160
PETS . . . . .	165
PLANT LIFE . . . . .	170
THE POST OFFICE . . . . .	175
PROVERBS, QUOTATIONS . . . . .	180
RACES, PEOPLES . . . . .	185
THE RAILWAY . . . . .	190
THE SEA . . . . .	195
SHOPPING . . . . .	200
SIMPLE SURVEYING, MEASURING . . . . .	205
THE STREET . . . . .	214
TIMBER . . . . .	219
TITLES AND ABBREVIATIONS . . . . .	224
TOPOGRAPHY . . . . .	229
THE TOWN . . . . .	234
THE WAR . . . . .	239
WATER . . . . .	246
WATERWAYS . . . . .	251
WINDS, TIDES, CURRENTS . . . . .	256



## I.—AIRCRAFT.

### ✓1. Why does a balloon rise in the air ?

A balloon rises in the air for the same reason that a cork rises to the top of water. The upward pressure of the air on the balloon is greater than the weight of the balloon. The resultant upward pressure (and therefore the lifting power of the balloon) is the difference between the weight of the balloon and the weight of its own volume of air.

### 2. What is the difference between an aeroplane and an airship ?

An aeroplane is a heavier-than-air machine supported by the pressure of its planes on the air. An airship is lighter than air. It is propelled in the same way as an aeroplane, and it can be made to rise or fall by means of planes.

### 3. What are the disadvantages associated with the airships used as "war-craft" ?

(a) It forms an excellent target for an enemy. (b) It is not so easy to manœuvre as an aeroplane. (c) It is difficult to handle when making a forced landing. (d) It is more dependent upon weather conditions than the smaller aeroplane. (e) It is more costly than an aeroplane.

### 4. What is a dirigible ?

A dirigible is a balloon which can be steered and propelled in any direction.

### 5. What is (a) a monoplane ? (b) a biplane ?

The planes of a flying machine are the supporting surfaces by which it is sustained in the air. A monoplane has one main supporting surface or a single wing on either side of the body. A biplane has two supporting surfaces, the body of the machine being between the two planes.



## *Hydroplane—Estimating Speed*

### **6. How is an aeroplane controlled when in flight ?**

By means of a control-lever ("joy-stick") the pilot can steer his machine either up or down or from side to side, or maintain a lateral balance. Increasing the angle at which the planes meet the air increases the pressure on them and forces the aeroplane upward.

### **7. To what uses can a hydroplane be put in time of war ?**

(a) It can be used to search for hostile seacraft. (b) Submarines can readily be seen from it when moving at a depth of from ten to fifteen yards beneath the surface. (c) It can be used for bombing purposes in a naval engagement. (d) It, with others, may act as the "eyes of the Fleet."

### **8. Why is it difficult for an airman to estimate his speed when travelling, if he has no-mechanical means of doing so ?**

On land we are able to compare our rate of travelling with that of other moving objects, such as trains, motor cars, cycles, pedestrians, etc. Allowance must also be made for the rate at which the air is moving, *e.g.*, if the air is moving at forty miles per hour, an aeroplane travelling against it at sixty miles per hour only appears to be doing twenty miles per hour. An airman cannot compare his speed with that of other moving objects, as these are generally too far away to be seen. Or they may be hidden by clouds.

### **9. Why is a cloud of smoke made to rise in an aerodrome when men are learning to fly ?**

When learning the utmost care must be taken in landing a machine. In order to reduce risks to a minimum it is necessary for the pilot to know in which direction the wind is blowing so that he can land against it, thereby using it as a steadying force. It is customary to burn

## *Metal Used—British Marks*

sulphur or some other material which gives off a cloud of smoke so that the airman may see the direction of the wind.

**10. What metal is largely used in the construction of aircraft, and why?**

In making the frame of an airship or parts of the engine in an aeroplane, strength combined with lightness is a most important consideration. To secure this aluminium is largely used.

**11. An aeroplane is noticed flying at a moderate height. How can an observer below ascertain whether it is a British machine?**

Concentric circles of red, white and blue are painted on the under surfaces of the planes. The identity of friendly or enemy machines is thus readily established. This is very necessary where military machines are concerned.

**12. What is meant by (a) banking? (b) volplaning? (c) stability?**

(a) "Banking" is the practice of making a turn with the inner side of the aeroplane lower than the outer.  
(b) "Volplaning" means gliding or coasting with the engine shut off. (c) "Stability" means steadiness in flight whether longitudinal or horizontal.

**13. Why are the ends of an airship rounded?**

The ends of an airship are rounded in order to decrease the resistance of the air to the great mass of the airship. The air is deflected from the convex surface more readily than from a flat surface.

**14. What is a captive balloon?**

Captive balloons which are of great use in war for watching the enemy's movements, observing the effects

## *Starting Aeroplane—Petrol Supply*

of artillery fire, taking photographs, making maps, and giving and receiving signals, are those which are kept under control from the ground. They can be hauled down by ropes or allowed to ascend at will.

✓15. From what bird did the inventors of aeroplanes learn many lessons?

A sea-gull hovering round a ship or over the water reminds one of the movements of an aeroplane. A slight turning of the wing tips is all that is necessary when it swoops down. This movement has been imitated in the ailerons of the aeroplane.

16. How is an aeroplane started preparatory to a flight?

The propeller blade is pushed down by hand. The engine responds simultaneously and the motion continues. The machine runs along the ground, and when sufficient speed has been acquired it rises into the air.

17. What is (a) a shock-absorber? (b) an anemometer?

(a) A shock-absorber is an appliance fitted underneath an aeroplane for lessening the impact when the aeroplane descends to the ground after a flight. (b) An anemometer is an instrument for measuring the force, velocity, and pressure of the wind.

18. An airman has to take precautions against shortage of petrol when on a flight. What provisions are made against this?

Many aeroplanes are fitted with a reserve tank, which is placed on the top of the uppermost plane of the machine. This supply of petrol can be used in an emergency. It is easily transferred to the engine tank when required.

## *Turning an Aeroplane—Looping*

19. How is an aeroplane turned in the air without upsetting its balance ?

The main planes of an aeroplane have plates at the ends which can be lowered or flattened. When the pilot is making a turn he moves the lever which controls the upright plane or rudder at the back of the machine in order to make the machine curve. The latter would overturn were it not that the flaps are lowered at the outside of the turn. This causes the outside of the plane to rise.

20. What must an airman do if he intends to indulge in "looping," "nose diving," etc., when on a flight ?

He must be secured in his machine by means of a belt. This is so constructed that should the airman owing to his machine breaking into flames wish to leap from it he can remove the belt by means of levers very quickly and get clear of his machine.

## II.—AIR AND VENTILATION.

1. What are the gases of which air is composed, and in what proportion are they found ?

Air is composed of :—

Nitrogen	.	.	78 per cent. (about)	-
Oxygen	.	.	21 per cent.	„
Argon	.	.	1 per cent.	„
Carbon dioxide	.	.	04 per cent.	„

In addition, there is a very variable amount of water vapour, and there are small quantities of ozone, ammonia and other gases.

2. What are the main characteristics of oxygen ? Why is it essential to life ?

Oxygen is an invisible gas without taste or smell. It does not burn but things burn in it. It is necessary, in order to oxidize (or burn) the food taken into the body, so that the supply of bodily energy and heat may be maintained. It is taken into the body through the lungs. Oxygen in the air breathed in passes through the lung tissue to the blood. It also serves the purpose of a purifying agent, by combining with poisonous organic matter in the blood.

3. What is ozone ?

Ozone is a more active form of oxygen, and is frequently found in mountain and sea air. It has a very fresh and pungent smell which is often noticeable after a thunderstorm.

4. What injurious gas is found in the air of a stuffy room ?

Carbon dioxide. It is breathed out from the lungs. If a room containing people is closed, the proportion of oxygen decreases whilst the proportion of carbon dioxide increases.

## *Nitrogen—Carbon Dioxide—Impurities*

### **5. What purpose is served by the nitrogen in the air ?**

Nitrogen is essential to all forms of life, being found in the tissues of animals and plants. It is invisible and has no taste, or smell. It will not burn, and things do not burn in it. In the air it dilutes the oxygen in the same way that water dilutes spirits. In an atmosphere of undiluted oxygen animals would live too rapidly. Nitrogen is also elaborated by certain plants, from nitrogenous compounds in the soil, and is stored in their tissues as a food.

### **6. Although human beings are constantly giving off carbon dioxide, and using up the oxygen of the air, the composition of air remains constant. How is this ?**

Plants under the influence of sunlight absorb carbon dioxide from the air through pores in the leaves, retain the carbon and set free the oxygen. In this way equilibrium is maintained between the oxygen and carbon dioxide in the air.

### **7. What do you know of (a) suspended impurities ? (b) gaseous impurities in the air ?**

Air usually contains a proportion of solid matter suspended in small particles. The nature and the quantity of such impurities depends, of course, upon circumstances : thus, the air of towns will contain more solid impurities—of dust, carbon (in smoke), etc., than the air over country places. The air of crowded rooms will contain particles of organic matter (usually poisonous) given off by the lungs. Gaseous impurities emanate from sewers, marshes, graveyards, chemical works, etc., and give rise to various ailments, including vomiting, diarrhoea, etc. Sulphurous acid, which is prevalent in towns where coal and gas are largely burnt, is one of the chief causes of the difficulty experienced in cultivating trees or shrubs in such localities.

## *Chimneys—Ventilation—Testing Air*

- ✓ 8. Name some of the ill effects which follow the breathing of impure air.

Through an extended stay in crowded and ill-ventilated rooms headaches, faintness, lassitude, and giddiness result, and if relief be not afforded, serious effects follow, due to the fact that the oxygen in the red corpuscles in the blood is not renewed.

- ✓ 9. Why are the chimneys of factories, chemical works, etc., usually lofty ?

The air from the chimneys of furnaces, brick kilns, etc., is often poisonous, but after diffusion and dilution with the air outside becomes fit for breathing again. Hence the reason for tall chimneys. Tall chimneys also produce a strong draught through the fires and make them burn furiously.

- ✓ 10. What is meant by ventilation ?

By ventilation is meant the removal of the poisonous gases which collect in the air of inhabited rooms or houses, and the supply of pure air.

11. What is meant by the diffusion of gases ?

All gases have the property of spreading out or diffusing in every direction till they fill all the available space. This results in keeping the composition of the air uniform, and prevents carbon dioxide, which is the heaviest of atmospheric gases, from collecting in a layer on the earth's surface, with the oxygen above it, and the nitrogen above the oxygen.

- ✓ 12. State how the purity of the air in a room can be tested.

Take a stoppered bottle with a wide mouth, and wipe it clean. Allow it to stand in the room so that the air may enter it. After a time pour into it some clear lime water, replace the stopper and shake up. If the lime

## *Stoves—Space—Systems of Ventilation*

water becomes milky the air contains too much carbon dioxide and the room is unhealthy.

**13. At what temperature should an ordinary living room be kept ?**

The correct temperature for an inhabited room is about 60° F. In the case of young children, a higher temperature is desirable. The surface area of the skin, from which evaporation takes place, is, in children greater in proportion than in the case of adults ; they therefore lose heat more rapidly, and this heat must be restored by the maintenance of a correspondingly higher temperature.

**14. Why are stoves unsatisfactory for heating rooms ?**

One of the main objections to the use of stoves is that they render the air of a room too dry—a certain amount of water vapour in the atmosphere of a room is essential to health. Being closed, they receive a very limited supply of oxygen, and carbon monoxide is generated in them. This readily passes through red hot cast-iron. Carbon monoxide is poisonous. As ventilating agents they are of very little account. The tendency to render the air of a room dry and therefore irritating is obviated by keeping a vessel of water on or near the stove, when the evaporation of the water will keep the air moist.

**✓15. What amount of space is necessary for each person in a room, and why ?**

About 1,000 cubic feet of air space per head is necessary in order that ventilation may be carried out without discomfort or draughts.

**16. What is meant by (a) Natural ventilation ?  
(b) Artificial ventilation ?**

Natural ventilation is the supply of pure air without the use of forced draughts. Artificial ventilation is



## *Inlets and Outlets for Fresh Air*

effected by the use of machinery and mechanical contrivances.

✓ 17. Where should openings for the exit of foul air in a room be placed, and why?

Foul air is warm and therefore light. It rises to the top of a room. Hence openings for the outlet of bad air should be placed near the ceiling or in the ceiling itself.

18. What is meant by the "Hinckes Bird's" method of natural ventilation?

This method is applicable to sash windows, and was introduced by Dr. Hinckes Bird. It consists in raising the lower sash of a window a few inches and then fitting in the aperture a block of wood cut exactly the same size. The air then enters the room in an upward direction between the two sashes and no draught is experienced.

19. In large and crowded buildings, it is often necessary to have artificial ventilation. Say how this can be provided.

This may be done: (a) By extraction, when the foul air is drawn out of the building by mechanical means and fresh air is allowed to replace it, or (b) By driving, when fresh air is forced into the building displacing the foul air found there.

20. Where should the inlets for fresh air be placed in a room, and why?

Inlets for the admission of fresh cold air should be above the level of the heads of those occupying the room, the current being directed upwards and diffused in order to avoid unpleasant draughts. They should not be placed too near the roof or the air will probably leave by the outlet without spreading through the room.

### III.—ARCHITECTURE.

#### 1. What is the meaning and aim of architecture ?

Architecture is the application of science and art to building, in order that a structure shall not only serve the purpose for which it is erected, but at the same time appear pleasing to the eye and in keeping with its surroundings.

.

#### 2. Of what were Saxon churches and houses built, and why ?

Saxon churches and houses were built mainly of wood, because wood was available in large quantities in all parts of the country. Stone was used very extensively in the Norman era. The Normans worked it with much success.

#### 3. What were the main features of Norman architecture as regards position and style ?

(a) The buildings were usually placed in commanding positions for purposes of defence. (b) They were generally built by the side of a river, with a moat on the landward side. (c) The main walls were of enormous thickness, - being from 8 to 12 feet thick. (d) The main walls were surmounted by a parapet at the angles of which look-out towers were placed. (e) In the centre of the courtyard, surrounded by a moat, stood a keep or tower several stories high.

The Norman style is characterized by : (a) Massive walls and towers ; (b) flat roofs ; (c) narrow holes for windows ; (d) roofs with raised parapets with embrasures ; (e) semi-circular arches.

## *St. Paul's—Street Architecture—Temples*

**4. Who was the architect of St. Paul's Cathedral, and what is the special feature of the famous church ?**

Sir Christopher Wren was the architect and builder of St. Paul's Cathedral, the most famous feature of which is the dome, surmounted by a cross. He built many churches and buildings after the Great Fire of London.

**5. What city has the finest street architecture in the world ?**

Paris has the finest street architecture in Europe, if not in the world. Amongst many magnificent buildings are the Louvre, Tuileries, and the Hotel des Invalides.

**6. What is (a) a "monolith" ? (b) a "beehive hut" ?**

A "monolith" is a pre-historic structure consisting of a single upright stone very often of gigantic proportions.

A "beehive hut" is a type of pre-historic dwelling built of stone, and resembling a beehive in shape.

**7. Why are many of the ancient temples supported by columns ?**

Most of the ancient temples of Egypt were built entirely of stone. In order to support these heavy structures a large number of columns had to be built. The roofs were made of stone because timber was scarce.

**8. What famous temple was made almost entirely of wood, and why ?**

The temple of Solomon was made almost entirely of cedar-wood which grew in profusion in Lebanon. Cedar-wood is remarkable for its great durability and its fragrance.

## *Pyramids—Pre-historic Dwellings*

- ✓ 9. Where are the pyramids, and why are they so famous ?

The Pyramids, which are the oldest monuments in the world, are in Egypt. They are solid masses of masonry of enormous size. They are sepulchral monuments which are entered in all cases from the north by a long passage inclining downwards and then upwards to the centre where the sarcophagus chamber is situated. The great pyramid "Cheops," named after the king of that title, has a square base each side of which is 768 feet long. It is 480 feet high.

- ✓ 10. What are "lake dwellings" ?

"Lake dwellings" were used in olden times as a protection against floods. They were made of wood and were erected on piles above the water level.

11. What is (a) a cromlech ? (b) a moat ?

(a) A cromlech is an ancient monument in the form of a huge stone supported on vertical stones. (b) A moat is a ditch dug round a house or fortress as a means of defence. A drawbridge gave access to the house or fortress. When not in use the drawbridge was drawn up.

- ✓ 12. Where did pre-historic people usually build their houses, and why ?

In northern and tropical districts they dwelt in caves beneath the ground. In this way they were protected against extremes of climate, and as they could hide themselves completely if they wished, these caves served as a means of defence. In temperate regions beehive huts and lake dwellings were used. In warm countries tents were used.

## *oriental Buildings—Triumphal Arches*

- ✓ 13. What precautions do the Japanese people take when building their houses to lessen the effects of earthquakes ?

The framework of the houses is of wood. Hence there is not the same difficulty in erecting them again should an earthquake overturn them. Wood is slightly elastic and is not so easily destroyed as stone. Until recently houses were only one storey high.

14. Describe in a few words a Chinese pagoda.

A Chinese pagoda is built in the form of an octagonal tower. It is several stories high, and has a staircase running to the top. The walls are made of brick or marble, and have numerous niches containing idols. The whole structure is lighted by narrow windows. Each storey has a projecting roof turned up at the corners and hung with bells.

15. What are " triumphal arches " ?

These were arches built originally in Rome in celebration of victories or in honour of great rulers. Modern arches consist of a large central arch flanked by two smaller arches. The whole structure is usually decorated in a profuse manner.

16. What is (a) a crypt ? (b) a cloister ?

(a) A crypt is a subterranean cell or vault. The name is usually applied to such places situated underneath a church. (b) A cloister is an arched way or covered walk running round an ecclesiastical building. It is used for purposes of exercise or study.

17. What are the main characteristics of Gothic architecture ?

(a) The pointed arch is one of the main features of Gothic architecture. (b) Gothic architecture has an

## *Parts of a Church—Skyscrapers*

appearance of lightness and grace. (c) Slim columns are in evidence. (d) Much decorative work is introduced.

**18. What is (a) the nave? (b) the aisle? (c) the transept?**

(a) The nave is the body of a church. It extends from the chancel to the principal entrance. (b) An aisle is a side passage in a church. (c) The transept is that part of a church running at right angles to the nave on either side of the chancel.

**19. What building in England still remains as a perfect type of Norman building?**

The most perfect example of Norman building in England is the Tower of London. Battle Abbey is another famous Norman structure.

**20. What is a "skyscraper"? How are many of these buildings made to withstand the enormous strain placed upon them?**

The name "skyscraper" is given to any very lofty building, although it is generally applied to the many-storied buildings found in America. In order to strengthen them, steel frames are erected, and the framework is filled in with concrete and other forms of binding material.

## IV.—ATHLETICS.

1. What is meant by the expression " It isn't cricket " ?

✓ Cricketers as a rule play with such regard for fairness and gentlemanly conduct, that it has come to be looked upon as an example of what fair play implies. Hence if any person is guilty of an offence which shows a lack of fairness and consideration for others his action is referred to as " not cricket."

2. At a certain cricket match there was said to be " a good gate." What does this mean ?

A " good gate " means that a large number of people passed through the turnstiles, and paid for admission. In plain language there were a large number of spectators.

✓ 3. What length is a cricket pitch ? What are the " creases " ?

The distance from wicket to wicket is twenty-two yards. The creases are two lines, which indicate the boundaries of bowler and batsman. The bowling crease is the one behind which one or both feet of the bowler must be when he delivers the ball. The other is the " popping " crease. It is parallel to the former, and four feet from it. It must be respected by the batsman in a similar manner.

4. It has been said that " the battle of Waterloo was won on the playing fields of Eton." Explain what is meant by this.

The expression refers to the fact that the lessons which had been learnt in connection with the games played by the schoolboys at Eton served them in good stead in later life.

## *Cricket Scoring—Championship*

5. The following entry is made in a cricket-scoring book. What does it signify ?

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.	.	.	.

The scorer records the progress of a cricket match ball by ball, six consecutive balls bowled constituting an over. In the first example no run was scored, the six dots indicating a "maiden" over. The second example shows that the second ball resulted in a wicket being taken, whilst the fourth ball resulted in two runs being scored.

6. What is meant by L.B.W. ? A Yorker ? Stonewalling ?

L.B.W. means leg-before-wicket, and indicates that the ball would have hit the batsman's wicket had he not arrested its progress in an illegal manner. The batsman is declared "out," and must retire. A "yorker" is a ball which pitches on, or just inside, the popping crease. "Stonewalling" is the practice of staying in a long time without scoring, the term being derived from the name of the famous American General, Stonewall Jackson.

7. In a cricket league the teams sometimes play a different number of matches. What method is adopted at the end of the season in arriving at the conclusion as to the championship ?

To arrive at a fair decision a system of percentages is used, *e.g.*, suppose one team had played 15 matches, securing 12 points in all, whilst another team had played 12 matches, securing 9 points altogether, the respective percentages would be 80 per cent. and 75 per cent.



## *Football—"Caps"—Baseball*

**8. What are the two kinds of football played in England ?**

(a) Association football. In this game a round ball is used, there are eleven players on each side, and only the goalkeeper is allowed to use his hands in playing the ball. (b) Rugby football. In this game an oval-shaped ball is used. It may be either kicked or handled. There are fifteen players on each side.

**9. What is meant by "getting his international cap" ?**

This means that a player is selected to represent his country in an International match. It is the highest honour to which an athlete can aspire in the world of football and allied games.

**10. What is meant by (a) a "feint" ? (b) a "dribble" ? (c) "foul" play ?**

(a) A "feint" is a pretended movement. (b) A "dribble" is the practice of moving forward in football and hockey by short kicks towards an opponent's goal. (c) "Foul play" means unfair play.

**11. What is the national game of America ?**

Baseball is the national game of America. It is so called because of the four bases or bounds which mark the course each runner in the game must take. It resembles the game of rounders except that it is far more strenuous.

**12. A person is too old to indulge in vigorous games. Mention two suitable games for such a person.**

The two most popular games for persons of this type are golf and bowls. They are both suitable for those who can no longer indulge in games requiring the expenditure of much energy.

## *Golf and Tennis*

13. Which country is called the "playground of Europe," and why?

Switzerland is frequently referred to as "the playground of Europe" because of the sports which can be enjoyed in connexion with its natural facilities, *e.g.*, tobogganing, curling, ski-ing.

14. Which English game is well adapted for playing by both sexes?

Lawn tennis is almost ideal in this respect. Golf and hockey are also suitable, but the conditions under which they are played are not always conducive to comfort and enjoyment.

15. What is meant by (a) a "fault"? (b) a "line" ball? (c) "deuce"?

(a) A "fault" in tennis is hitting the net with the ball when serving, or serving it outside the bounds of the court. (b) A "line-ball" is one which the server drops on the line of the service court. It should drop inside the court. (c) "Deuce" is the score of three points to each side in tennis. When "deuce" has been called one side must win two points in succession before the game is won.

16. What is (a) a caddie? (b) a foursome? (c) a tee?

(a) A caddie is a person who carries a golfer's clubs. (b) A foursome is a golf match in which four persons take part, two — playing alternately — against the other two. Each side plays one ball. (c) A tee is a heap of sand on which the golf ball is placed for the first stroke after each hole.

## *Amateurs—"Friendly" Matches*

### **17. What is meant in sport by an "amateur" ?**

An amateur is a person who plays a game without being paid. A player still counts as an amateur if his expenses are paid.

### **18. What is meant by M.C.C., F.A., R.U. ?**

(a) M.C.C. = Marylebone Cricket Club, the controlling body in English cricket. (b) F.A. = Football Association, which controls Association football in England. (c) R.U. = Rugby Union, the body which regulates and controls the Rugby game in each country.

### **19. What is a "friendly" match ?**

A "friendly game" is one arranged between the contestants themselves, and is not under the control of any league or competitive combination.

### **20. What is meant by "being a sport" ?**

By "being a sport" is meant acting up to the best traditions of English sport—refusing to take unfair advantages, abiding loyally by competent decisions, taking risks and accepting the consequences without grumbling, "playing for the side" rather than for one's own benefit.

## V.—BANKING, MONEY.

1. What is meant by saying a thing is as "safe as the Bank of England" ?

The Bank of England is the custodian of the money belonging to the public funds of the nation and is manager of the public debt. Its affairs are managed by great and prudent financiers and it has behind it a national guarantee, so that it is as certain as anything human can be that the Bank of England will meet all its liabilities and fulfil all its obligations.

✓2. What is the "National Debt" ?

The National Debt is money borrowed by successive Governments, the interest being paid out of general taxation. This debt was instituted when the needs of the Government compelled it to appeal for aid to the moneyed classes. In early times loans were secured on the King's or Queen's personal credit, but after the revolution of 1688 the credit of the nation replaced that of the Sovereign. Every war adds enormously to the amount of the debt. It is reduced in peace time by using sums of money set aside by Parliament for that purpose and also by using surplus revenue. The Government broker buys debt in the Stock Exchange. This debt is then cancelled.

3. When is a person said to be (a) "making money" ?  
(b) an annuitant ?

(a) When a person is thriving in business or in his profession and is receiving a large income, he is said to be "making money." (b) An annuitant is a person in receipt of a certain sum of money paid yearly, or by instalments at stated periods during the year. The Government and insurance companies pay annuities for

## *Stocks and Shares—I.O.U.—P.O. Bank*

life in return for a single payment or for a number of smaller payments at intervals up to a specified age.

### **4. What is the difference between stock and shares ?**

Stock can be bought in any quantities. Shares can only be bought as units.

### **5. What are (a) "ordinary" shares ? (b) "preference" shares ?**

(a) "Ordinary" shares are shares on which dividends are paid depending on the profits made during the year.

(b) On "preference" shares a certain rate of interest is fixed, and this must be paid before anything goes to the holder of ordinary shares.

### **6. What is a "run on the bank" ?**

In times of panic sudden demands are often made by the clients of a bank for a return of their money. Such an occurrence is called a "run on the bank." As most of the money held by a bank is invested in securities, the bank may have great difficulty in meeting these demands.

### **7. What is an "I.O.U." ?**

An "I.O.U." ("I owe you") is a symbol of indebtedness. It consists of a simple statement acknowledging the indebtedness of the one by whom it is signed and dated.

### **8. A person joins the Post Office Savings Bank on 31st July. What must he do each year on that date, and why, so long as he has an account ?**

Each person opening an account with the Post Office Savings Bank receives a deposit book. The depositor must send in the book each year on the anniversary of the day on which he opened the account in order that interest may be added and the account audited.

## *Cheques Crossed—Green-backs*

### ✓9. What is a cheque ?

A cheque is a written order made upon a bank to pay a stated sum of money to the person named on the cheque. The person to whom payment is to be made must "endorse" the cheque, *i.e.*, sign his name on the back of it.

### 10. Why are cheques often "crossed" ?

A cheque is crossed by writing "& Co." across it. When this is done the amount can only be paid through a bank, *i.e.*, the cheque must be paid into a banking account. There is thus an accurate record of the person to whom payment is made. A crossed cheque is thus a very safe way of paying money.

### 11. Why do many people pay their accounts by means of cheques ?

(a) A record is thus kept of expenditure. (b) Cheques are more convenient, especially where large sums are involved. (c) A cheque is a receipt in itself as it must be endorsed by the recipient. The drawer has conclusive evidence that such a sum has been paid, when it was paid, and to whom it was paid.

### 12. What is a "green-back" ?

A "green-back" is a treasury note issued by the United States Government. It is so called because the back of the note is printed in green ink.

### 13. When is a cheque said to be "dishonoured" ?

A cheque is said to be dishonoured when the banker on whom it is drawn refuses to pay the amount because he has not sufficient funds in his hands belonging to the drawer to meet it. A person whose cheques are likely to be dishonoured is always notified by the bank when such an occurrence is likely to happen.

## *Days of Grace—Clearing House—P.O.'s*

### **14. What are "days of grace" ?**

"Days of grace" are the days, usually three, which are allowed to elapse after a bill becomes due, before payment is demanded.

### **15. What is the banker's "clearing house" ?**

In the early days of banking each banker had to send a representative to every other banker in London to collect the amounts payable by them to him. This involved much waste of time as business increased, and a clearing house was established where all differences between banks are adjusted. Many of the large provincial towns have clearing houses of their own. Country banks are represented at the Clearing House in London, by their banking agent in that city.

### **16. What is a "Bill of Exchange" ?**

A "Bill of Exchange" is a promise to pay a certain sum on a specified date. It is drawn up by the one to whom the money is owed, and is signed by the one owing the money. After being signed ("accepted") it is returned to the drawer.

### **17. What is meant by endorsing a cheque, and who can do this legally ?**

Before payment is made in respect of any cheque the cheque must be endorsed by the payee. The signature should be exactly the same as the name on the cheque.

### **18. A man has very few business transactions and consequently does not resort to the use of cheques. What simple substitute can he use for paying small amounts sent through the post ?**

Postal orders are provided for the payment of small amounts through the post. To ensure safety they can be crossed in exactly the same way as a cheque ; and if

## *Financial Terms—Stock Exchange*

the counterfoil is properly filled in and retained this method of sending money is quite safe.

19. What is (a) the Stock Exchange ? (b) brokerage ? (c) dividends ?

(a) This is a place where dealers buy and sell shares conducting their business in conformity with settled rules and usages. (b) This is the name given to the commission which stock brokers receive, in connexion with the purchase and sale of stock. (c) After all expenses of a company have been paid the profits are divided among the shareholders according to the number of shares held by each. These dividends are usually stated as so much per cent.

20. What do we mean when we say shares are "at par" ? "at a premium" ? "at a discount" ?

A share is "at par" when its market value is the same as its nominal value. A share is "at a premium" when its market value is greater than its nominal value. A share is "at a discount" when its market value is less than its nominal value.



## VI.—BIRD AND ANIMAL LIFE.

### ✓1. In what ways are birds specially fitted for flying ?

Their bodies are shaped for moving through the air with the least amount of resistance ; their bones are hollow and light ; the muscles which help to move the wings are tough and strong ; their eyesight is remarkably keen.

### 2. What are migrants, and why do such birds migrate ?

In bird-land many of the inhabitants spend their time, in different parts of the world, at different times of the year. The swallow is a typical migrant, spending summer in our own country and returning to warmer climes before winter. This practice is generally followed by insect-eating birds. If they stayed in this land during the winter they would starve for lack of food.

### ✓3. Why do birds differ in colour ?

Birds differ in colour according to the surroundings in which they live. They are hidden and protected similarly between their plumage and their haunts. In the arctic regions the general colour is white ; in the tropics the most gorgeous colours are found.

### ✓4. How is it that the feet of birds differ so widely in shape ?

The feet of birds are adapted to the lives which they lead. Birds which spend their time in the water have webbed feet ; those which spend their time in the trees have feet for perching ; climbing birds like the parrot and woodpecker have two toes in front and two behind and can thus climb with ease ; those living in marshy districts, such as the stork and heron, have long stilt-

## *Birds—Poultry—Cuckoo—Skylark*

like, legs ; those which spend most of their time on the ground have feet suitable for walking.

✓5. Why do birds sing less in late spring and early summer than in early spring ?

In late spring and early summer the birds are engaged in attending to the wants of their young ones, and they are not anxious to attract the attention of enemies which might pounce upon their young and destroy them.

6. Why is it customary to give poultry some form of grit when they are confined in a small run ?

In the wild state they are able to pick up and swallow small stones. These assist in breaking up the grain and other hard food, which is taken into the crop without being broken up. They have no teeth.

7. Why is the duck provided with fringes inside its beak ?

The duck with its shovel-shaped bill takes up a quantity of mud, insects, etc. By means of the fringes it lets the mud and water run out at the sides but retains any worms or grubs which may be present in the mud.

✓8. What bird lays its eggs in the nests of other birds ?

The cuckoo either lays or deposits its eggs in the nests of other birds. When the young cuckoo hatches out it proceeds to clear the nest of all other eggs and occupants. There is a hollow in the back of the young cuckoo till it is a fortnight old. Into this it gets either egg or nestling, and throws it out of the nest.

9. Why does a skylark build its nest on the ground ?

The skylark is a running bird, *i.e.*, it is specially fitted for living on the ground. It builds its nest where the

## *Corncrake—Rooks—Woodpecker—Owl*

young ones will be in suitable surroundings for their mode of life.

10. What bird is called the "ventriloquist" of bird-land, and why?

The "corncrake" or landrail has a habit of turning its head when uttering its familiar cry with the result that the sound appears to come from the opposite direction.

11. Why can rooks use the same nests year after year?

Rooks build their nests of thick twigs and place them in the tops of tall trees. Here they are free from molestation and can be used year after year, only needing to be repaired.

✓ 12. What bird helps to prevent the timber of trees being eaten by insects?

The woodpecker has a strong beak with which it can bore its way through the bark of trees until it comes to the place where grubs and harmful insects are found. It appears to tap on the bark and to tell by the sound where these are to be found. After exposing the grubs it thrusts out its long tongue and seizes them before they can escape.

✓ 13. Why does the owl generally come out at night time?

The food of the owl consists chiefly of rats, mice and frogs. These animals come out at night and the owl is then able to seize them. The eyes of the owl have very large pupils so that it can see well at night. Bright light dazzles the owl.

## *Earthworms—Mole Toad—Insects*

14. Name a bird which :—

- (a) Sings at night. (b) Makes its nest of mud under the eaves of houses, in barns, etc.  
(c) Secures its food by fishing. (d) Is specially protected by the people of Holland.

(a) The nightingale. (b) The swallow. (c) The kingfisher. (d) The stork.

✓ 15. Of what use are earthworms ?

Worms break up the soil ; they make spaces which allow air and water to pass through to the roots of plants ; the castings serve as manure.

✓ 16. Why has the mole specially protected ears ?

The mole lives under the ground and would find its ears blocked with soil were they not protected by stiff hairs. The ears are very small and are hidden amongst the fur.

✓ 17. How does a toad secure its food ?

The toad is provided with a tongue which is covered with a thick slimy matter. It thrusts its tongue out with rapidity and seizes insects in large numbers. Gardeners often keep them in their gardens to destroy pests.

18. What insect devours the greenfly on plants and shrubs ?

The ladybird lays her eggs on plants where greenfly and other aphides live. The grubs live on these pests.

✓ 19. What is an insect ? How does it breathe ?

The word insect means " cut into," and an insect is a creature which has three distinct parts—head, chest, body, and breathes by means of holes in the side of its

## *Distinction between Butterfly and Moth*

body. Insects have six legs. Insects pass through four stages—the egg, the larva or grub, the pupa, and the perfect insect.

**20. How can a butterfly be distinguished from a moth ?**

A butterfly may be distinguished from a moth by the feelers. In the case of butterflies these are club-shaped whilst those of the moth have no swellings at the end. When resting the wings of butterflies are upright ; those of moths are folded one under another. Generally butterflies are diurnal and moths nocturnal, but this is not a very reliable guide.

## VII.—CARDINAL POINTS, HEAVENLY BODIES, &c.

1. Which are the four cardinal points, and why are they so called ?

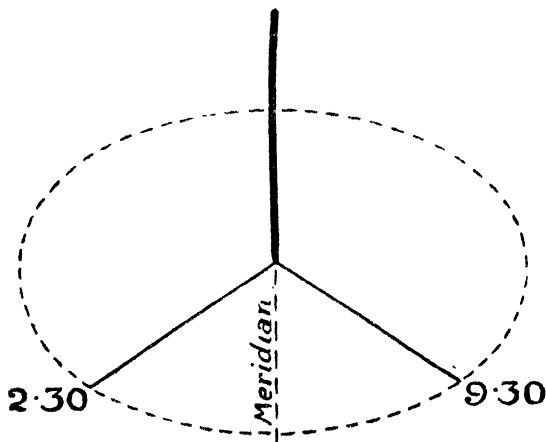
The four cardinal points are North, South, East, and West, and are so called from the Latin “cardo”—a hinge, because the other points are supposed to turn or hinge upon the four principal points.

2. How many cardinal points can be determined if any one is known ?

If any one of the cardinal points can be determined the other can very readily be fixed. If an observer face the north, the south is exactly behind him, the east is on his right hand, and the west on his left hand.

3. What is meant by a meridian ? How can the meridian of a place be found ?

The meridian of any place is the line on which the sun casts a shadow at mid-day. If the line were con-



## *Points of Compass—Magnetic Compass*

tinued in both directions it would pass through the north and south poles. Set up a stick, and measure the length of its shadow at 9.30 in the morning. Say it is 3 feet. With a piece of string 3 feet long and the stick as centre, describe a circle. At 2.30 in the afternoon it will be found that the shadow again just touches the circumference of the circle on the other side of the stick. If lines be drawn from the foot of the stick to the two points where the shadow met the circle at 9.30 and 2.30, and the distance between the two halved, this will give the meridian of the place.

**4. Why is it necessary that direction as well as distance should be known when fixing the positions of places ?**

Because if given the distance alone from some point, this would only fix the place as being somewhere on the circle with the point as centre and the distance as radius. Distance and direction fix the point exactly.

**5. How many points are marked on a mariner's compass ?**

There are 32 points called "points of the compass." They are :—

N., N.b.E., N.N.E., N.E.b.N., N.E., N.E.b.E., E.N.E., E.b.N.

E., E.b.S., E.S.E., S.E.b.E., S.E., S.E.b.S., S.S.E., S.b.E.

S., S.b.W., S.S.W., S.W.b.S., S.W., S.W.b.W., W.S.W., W.b.S.

W., W.b.N., W.N.W., N.W.b.W., N.W., N.W.b.N., N.N.W., N.b.W.

**6. Why is it necessary for a mariner to study this instrument thoroughly ?**

The mariner has to learn the points of the compass backwards and forwards in order to become thoroughly conversant with them. A slight error when in a dangerous position might have disastrous consequences.

## *Finding Direction by Means of the Sun*

**7. Why does the needle of the mariner's compass point to the north ?**

Because it is magnetized. The earth acts as a magnet, and it is to the pole of the earth magnet that the compass needle points, not the true north. Allowance must therefore be made for the variations of the compass needle from the north. Tables have been constructed showing the amount of variation at different places. These tables are used by navigators.

**8. What provision is made to prevent a compass being upset by the rolling of a ship ?**

The compass is pivoted in a ring which is itself pivoted. The lines of the two sets of pivots are at right angles. This arrangement allows the compass to be always horizontal.

**9. A traveller in a strange country finds himself unable to fix his direction. If the sun were shining and he had a watch in his pocket, how could he do so ?**

Point the hour hand to the sun, then midway between the hour hand and XII. on the dial is the direction of the south. The other cardinal points can then be readily located.

**10. How can the points of the compass be determined on a starry night ?**

Before the mariner's compass was invented sailors were dependent during the night upon stars. Two stars in the Great Bear are called "pointers" because they point towards the North Star which marks the north almost exactly.

**11. A labourer working in the fields has no watch. If the sun is shining, how can he tell when it is 12 o'clock ?**

It is customary for men working in the fields to fix twelve o'clock (when they usually make a break in the



## *Weather-vanes—Sun-dial*

work) by noticing the direction of their own shadow. When it falls directly in front of them, the sun being at their backs, they know it is midday. If it falls to their right midday has passed, if to their left it has not arrived.

**12. What are weather-vanes, and why are they placed in prominent positions ?**

A weather-vane is a thin plate of metal or wood cut into the form of an arrow or some fanciful device. It is mounted on a vertical rod, and responds freely by rotation to the force of the wind. It is usually made to point in the direction from which the wind blows. Weather-vanes are placed in prominent positions : (a) in order that they may catch the force of the wind, however gentle it may be ; (b) in order that they may readily be seen.

**13. How can you " read " a " weather-vane " ?**

The wind blows against the broad end of the vane, and carries it with it. This causes the point of the vane to face the wind. Hence the point of a weather-vane always faces in the direction from which the wind blows.

**14. In almost every town and village are found buildings which help us to fix the cardinal points. What buildings are they ?**

Churches are built with the chancel at the eastern end. Hence the cardinal points can easily be determined by looking at a church. Where there is a spire or tower, it is usually placed at the western end.

**15. What is a sun-dial ?**

A sun-dial is a device for showing the time by means of the shadow cast by a rod. The hours are marked on a flat surface below the rod.

## Map Reading—Distance of Sun

16. A person going for an early morning walk finds his shadow lies to his right. In what direction is he walking? Another person finds at midday that although the sun is shining on him, he has no shadow. What do you infer from this?

If the shadow fell on his right, then the sun must be on his left, *i.e.*, the east would be on his left. Hence he is walking from north to south. The inference to be drawn is that the person is in a part of the world where the sun was directly overhead, *i.e.*, somewhere between the tropics.

17. What simple contrivance could be made to use in connexion with a map for fixing both direction and distance?

Take a piece of transparent paper and draw on it a circle divided into thirty-two parts corresponding to the compass card. Let the radius of the circle serve as a scale of miles, *e.g.*, if the map is drawn to a scale of 1 inch to a mile, then a radius of 3 inches will represent a distance of three miles, etc. When this has been completed place the drawing on the map, taking care that the north of the compass paper points to the north of the map. It will be found to be of the greatest use in fixing distance and direction. It might be advisable where a map is drawn to a very small scale, to divide the compass card into eight or sixteen divisions only.

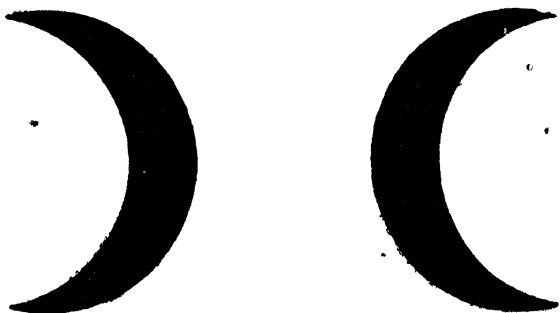
✓ 18. In what direction is the sun never seen? How far is the sun from us?

(a) In the north. (b) Roughly 93,000,000 miles, the distance varying slightly from time to time. If a wire from the earth were connected to a bell in the sun, and the wire were pulled, it would take just about a year before the bell rang in the sun.

## *Moon—Astronomical Terms*

19. When is the moon said to be waxing ? waning ?  
How can you tell whether it is waxing or waning ?

(a) The moon is "waxing" when its illuminated surface is increasing from new to full moon, and it is said to be "waning" when it is decreasing from full moon back to new moon again. When "waxing" the crescent is a right handed one, when "waning" a left handed one.



✓ 20. What is meant by (a) a constellation ? (b) the "Milky Way" ? (c) a planet ? How can a planet be distinguished ?

(a) A constellation is either a group of stars or that part of the heavens occupied by such a group. (b) The "Milky Way" is the name given to a band of stars across the heavens. They appear as a mass of light covered with stars seen separately by the naked eye. (c) A planet is a body which revolves round the sun. Planets may be distinguished by the fact that they shine with a steady light and do not twinkle.

## VIII.—CLIMATE, WEATHER.

### 1. What is meant by the word weather ? climate ?

By weather is meant the atmospheric condition of a place at a given time. By climate is meant the average of all the kinds of weather which a country or region habitually experiences.

### 2. A discoverer finds a new island. In order to form some idea as to what its climate is likely to be, what must we be told about its position ?

He must know the latitude, that is its distance from the equator. As a general rule nearness to the equator implies a high temperature, although special local features may considerably modify the climate.

### 3. What men living in India find during the hot season that the heat is almost unbearable ? What is it customary for them to do at such a time ?

When the heat on the lower plains and in the valleys of India is very great, it is customary for Europeans to go and live in the mountains. The town of Simla, situated on the slopes of the Himalayas, is famous as a resort of this kind.

### 4. How would you explain the fact that Bergen is one of the wettest spots in Europe ?

The prevailing winds before they strike the hills which surround the town have swept over a large expanse of water. The hills act as condensers and the result is a very heavy rainfall.

### 5. What is meant by " a rainy day " ?

When the amount of rainfall on a certain day amounts to .01 inch or more, it is said to be a rainy day. The

## *Rain-gauge—Position of Dairy Farms*

amount of rain which falls is measured by means of a rain-gauge. It is interesting to remember that an inch of rain on an acre of ground weighs 101 tons.

### **6. What is a rain-gauge ? How is it used ?**

A rain-gauge is an instrument for measuring rainfall, and consists of a cylindrical vessel containing a bottle. The end of a funnel passes into the bottle. After a downfall of rain the contents of the bottle are poured into a graduated measure which holds  $\cdot 5$  in. of rain. The cylinder is considerably taller than the funnel to prevent snow when it falls from being blown about. The rain gauge should be placed in an open situation, away from buildings, etc., and at a height of a foot from the ground.

### **7. In which counties of England do we find the largest number of dairy farms, and why ?**

Dairy farms are found largely in Cheshire (famous for its cheese), Devonshire (noted for its cream), Cornwall and the western counties of England generally, because the moisture-carrying Atlantic winds which are the prevailing winds of England, deposit much rain in these areas. The heavy rainfall causes grass to grow well, thus providing food for cattle.

### **8. Why has Lancashire a greater annual rainfall than Cheshire ?**

The south-westerly winds from the Atlantic blow across Lancashire without interruption. Before they reach Cheshire, on the other hand, these winds pass over the Welsh mountains, where they lose much moisture.

## *Climate—Conditions affecting same*

- ✓ 9. Why is it generally cooler on the top of a mountain than in a valley ?

The atmosphere takes very little heat from the sun's rays as they pass through it. It is heated by contact with the earth which has absorbed the solar heat, and also by radiation from the surface of the earth. A larger proportion of the air is closer to the earth in a flat place than on the tops of mountains.

10. What is meant by a climate of extremes ?

There are two great divisions of climate : (a) Insular or oceanic ; (b) Continental or extreme.

An insular or oceanic climate is on the whole temperate, whilst a climate of extremes is very hot in summer and very cold in winter.

- ✓ 11. Why does nearness to the sea make a climate more equable ?

Water requires more heat than land to raise its temperature. Hence the land quickly becomes warm in summer and cold in winter. A large mass of water is comparatively cool in summer, but it has a large amount of heat which warms lands near it in winter.

- ✓ 12. How does soil affect the climate of a country ?

A clay soil retains moisture and cools the air overlying it. It often causes fogs. Sandy soil being hot and dry, tends to make the climate of a country hotter than it would otherwise be. Boggy soil gives rise to fogs.

- ✓ 13. What effect have mountain ranges on the climate of a country ?

Mountain ranges often act (a) as wind barriers. (b) As rain condensers. In the former class are the Himalayas,

## *Climate of Siberia—Australia—Isotherms*

which shelter the plain of the Ganges, and the Carpathians, which protect the Hungarian plain. In the latter class are the Himalayas, which condense the moisture brought by the south-west monsoons, and the Andes in South America.

**14. Why is Siberia such an excessively cold country considering its latitude ?**

Siberia slopes to the north. Hence it misses the warmth of the sun's rays, and the winters there are extremely severe.

**15. Suppose the forests of the Amazon valley were to be cut down, what effect would this have on the climate of the region ?**

The presence of trees in large numbers encourages condensation of moisture. Hence if the forests were cut down, there would be less rainfall. In times of heavy rain the Amazon would be unable to carry off the additional water and floods would occur. At the present time the vegetation absorbs much moisture which would otherwise rush down to the river.

**16. Why is the interior of Australia more or less a desert ?**

The mountain ranges of Australia are situated near the coast. The moisture-bearing winds from the ocean lose their moisture before they reach the interior, which is as a result parched and dry.

**17. What are isotherms ?**

Isotherms are lines drawn through places which have the same mean annual temperature.

## *Weather Forecasts—The Barometer*

**18. How is it possible to forecast the weather with reasonable accuracy ?**

Because the weather is dependent on certain conditions which have been established after years of observation and investigation. These conditions include :—

- (a) Pressure of the air. (b) Temperature of the air.
- (c) Amount of moisture in the air.

They can all be determined and weather forecasts can be made with much accuracy.

**19. What is a barometer ?**

A barometer (from Greek *baros*, weight ; and *metron*, a measure) is an instrument for measuring the pressure or weight of the atmosphere.

**20. What do you know of the “ habits ” of the barometer ? What do they indicate ?**

- (a) It falls slowly and steadily when bad weather is likely to follow.
- (b) When it falls rapidly heavy storms may be expected.
- (c) When it rises rapidly unsettled weather may be expected.
- (d) When it rises gradually, fine settled weather usually follows.



## IX.—THE COALMINE.

### ✓ 1. Of what is coal supposed to be made ?

Coal is supposed to have been formed from vegetation which grew upon the earth thousands of years ago. The soil was so fertile and the climate so warm that ferns and plants grew to a much greater size than they do now. Earth movements resulted in the trees and undergrowth sinking below sea level. Great thicknesses of rock formed above and the pressure and loss of moisture and gases changed the vegetation to coal.

### 2. What is meant by a seam of coal ?

Coal is found not in large solid masses as a rule but in layers called seams. Some of these are only a few inches thick, whilst others are many feet in thickness. The seams are generally separated from each other by layers of stone or clay. They are generally found so far below the surface of the ground that mines have to be sunk in order to get the coal out.

### ✓ 3. Fossils of sea animals are very often found amongst coal. How is this explained ?

The rocks which occur above the coal seams were gradually deposited below sea-level. Remains of marine animals would naturally fall into the old forests when they were in this position. Fossils result when these remains are replaced, bit by bit, by material from the rocks above. The presence of these fossils is evidence that the coal seams were once at least below sea-level.

### ✓ 4. What are the substances in coal which cause it to give out heat when burning ?

Carbon and hydrogen give out a large amount of heat when they are burned. These two substances occur in coal, carbon being the chief constituent.

## *Anthracite—Firedamp—Lignite*

### 5. What is anthracite ?

Coals which contain a large amount of hydrocarbon or bituminous matter, generally give off thick clouds of smoke when burning. These kinds are used for burning in the house fire grates and for the manufacture of coal-gas. Anthracite is a non-bituminous coal, for it contains hardly any hydrocarbon matter, and consequently gives off hardly any smoke when it is burnt. It consists almost altogether of carbon.

### 6. What is firedamp ?

The heat of the coal mine causes the coal to give off gas known as "firedamp." If this gas be mixed with air, and a naked light be brought into contact with it, explosions of a serious nature occur, causing loss of life, either by the explosion itself, or by suffocation from the carbon dioxide or "after damp" which results from the burning.

### 7. What is lignite ?

Lignite is a kind of coal found on the continent. It is composed of the remains of plants which grew at a later period than those from which ordinary coal has been formed. It comes midway between wood and coal, containing a large amount of water. It does not give out so much heat as ordinary coal.

### 8. Why is peat generally found in marshy ground ?

Peat has been formed in districts which were covered at one time by lakes. It consists of decayed vegetable matter. These lakes have dried up and left behind the great peat bogs. It is because of this that these bogs are always wet and marshy.

## *Coal By-products—Safety Lamps*

**9. Gas is termed the "product" of gas works. Name some of the by-products of coal-gas manufacture.**

Coke is a valuable by-product of coal-gas manufacture. Another valuable by-product is gas tar. From coal-tar are produced carbolic acid, creosote oil, which is a preservative for wood, naphtha, and saccharine, which is a substitute for sugar. Other by-products of coal-tar include dyes, ammonia, pitch, and coal briquettes.

**10. Explain the principle of the miner's safety-lamp.**

An ordinary lamp or candle cannot be used in a coal mine, as the flame would be liable to explode the "fire-damp." In the miner's safety-lamp a gauze surrounds the flame and this gauze allows the gas in the mine to pass through it and burn round the flame, but it prevents the flame passing outside the wire gauze and thus reaching the "firedamp."

**11. Why does a gasometer rise in the day time and fall at night time ?**

The gasometer in which coal-gas is stored rises in the day time because during that period more gas is being made than is being consumed. It falls during the night because the amount used is greatly increased.

**12. What is coke, and why is it so valuable a by-product of coal-gas manufacture ?**

After the gas and tar have been taken away from coal the substance left is called coke. It can be burned and gives out much heat ; but it gives no smoke as all the hydrocarbon has been taken away from it. It is frequently used in stores and for heating many kinds of furnaces.

## ***Steam Coal—Boring—Pit Shaft***

✓13. **Why do we use tar for protecting wooden fencing and posts placed in the ground ?**

Wooden sheds, railings, posts and any structures which are to be exposed to the weather are usually covered with a coating of tar, because water and tar do not mix. The water runs off the surface, and cannot penetrate through the tar and rot the wood underneath. In the manufacture of coal-gas, the tar sinks to the bottom of the water-tank because it is heavier than water, and does not mix with it.

14. **What is steam coal, and where is it chiefly found ?**

Steam coal is a kind of coal which gives off very little smoke. It is found chiefly in South Wales, and is used in the Navy because smoke would help the enemy to detect the presence of our vessels.

15. **What is meant by boring for coal ?**

Boring for coal is a method of finding whether coal seams exist in a locality. A long sharp steel chisel, worked by machinery, cuts through the layers of material. From time to time it is pulled up and another tool called a "wimble" is pushed down the bore or hole. When this is brought up it brings with it some of the materials through which the chisel has cut its way, and thus the men are able to find out whether coal exists there or not.

16. **Why is the shaft of a coal mine lined with bricks and supported with timber ?**

This is because the sides might otherwise fall in, and also to prevent the water in the ground from soaking through into the shaft.

17. **Why is a huge fire lighted at the bottom of some pit shafts ?**

This is done in order that the mine may be ventilated. The mine has two shafts at some distance from each

## *Mining Terms—Pit Ponies*

other. At the bottom of one shaft a huge fire is kept burning. This fire makes the air very hot and light. It is forced up the shaft by the greater pressure of the colder and heavier air about it. This is supplied by the other shaft. As it rushes along it mixes with the bad air and gases in the passages, but by the time it reaches the bottom of the shaft where the fire is burning there is too little firedamp in the mixture to cause it to explode. This constant circulation of air keeps the mine well ventilated. In many mines revolving fans take the place of the fires.

**18. What is meant by (a) a hewer ? (b) a putter ?**

(a) A hewer is a person who actually cuts away the pieces of coal. (b) A putter is a boy who pushes the trucks containing coal along the narrow passages until they reach a main road. Here a number of trucks are chained together and drawn by horses along lines to the bottom of the pit shaft.

**19. What is meant by (a) "Black diamonds" ? (b) "carrying coal to Newcastle" ?**

(a) "Black diamonds" is a term often used to describe coal. (b) "Carrying coal to Newcastle" is a derisive way of describing a superfluous action such as watering the garden when it is raining.

**20. What are pit ponies ?**

Pit ponies are used underground for bringing the coal from the various parts of the mine to the bottom of the shaft. These ponies live underground in stalls dug out in the sides of the road. After working for many years down the pit their eyesight is seriously affected, and through the absence of natural light in the mines they often become quite blind.

## X.—THE COUNTRY.

### 1. What is meant by a village "pound"?

A pound is an enclosure set apart for animals which have strayed on the highway or trespassed on private property. Every village formerly had one of these, but they are now falling into disuse. The impounder is compelled to supply the animals with food and water during the time they are in his care, but may recover the cost from the owner. If penalties connected with impounding are not paid, the council authorities are empowered to sell the animals after giving due notice and to deduct all expenses incurred. Any balance is handed to the owner.

2. Some villages are not sufficiently large to keep an ordinary policeman fully engaged. What is done in such cases to preserve law and order?

If a policeman is not stationed in a village, it is the custom to appoint a reliable resident to act as the "parish constable." He may be called upon at any time to quell disorder and assist in helping the regular police to protect people and property. "Special constables" are sworn in when policemen are too few to carry out the work which has to be done, or when the dangers which they have to meet in order to protect the public are very great.

3. Disputes often arise in rural districts over the question of footpaths. How are the rights of the public safeguarded?

The "Commons and Footpaths Preservation Society" watches the interests of the public in this important matter. They keep a keen look-out for infringement of rights in connexion with rights of way, village greens

## *Beating the Bounds—Sea-weed—Horses*

commons, etc. Local associations co-operate and bring before the notice of the parent association any question which they fail to settle satisfactorily in their own particular area.

### **4. What is referred to in the expression "beating the bounds"?**

This custom still survives in some districts, when the choir boys accompanied by the parish clerk or clergyman, make a procession round the village carrying sticks with which they beat the walls, fences, road, etc. They climb over fence and stream in their course, and when they return to school they are regaled with buns and milk. In olden times the boys were beaten round the parish bounds with sticks as a reminder of what would happen if they attempted to leave the parish without permission. Only the rich were allowed that privilege in those dark days.

### **5. Many country people keep a piece of sea-weed in the house for use as a weather indicator. How does this indicate the weather?**

The salt of the sea-weed readily absorbs moisture, hence if the atmosphere be damp the sea-weed becomes wet, indicating a likelihood of rain.

### **6. Horses often shy at unusual objects. What is the reason for this?**

It is probably due to defects of vision, the horse being unnecessarily frightened. The tendency to shy is said to be increased by the wearing of blinkers.

### **7. Farmers are very anxious during harvest time to learn what kind of weather is likely to be experienced during such a period. What course do they adopt?**

For a small charge the Royal Meteorological Society will send at regular intervals forecasts of what the

## *County Palatine—Sheep—Parish Church*

weather is likely to be. The leading daily newspapers contain weather forecasts for the district in which the paper circulates, and very often include them for all the districts of the country.

### **8. What is meant by "a county palatine"?**

A county palatine is so called because the lords of such counties were invested with royal privileges and rights. The earl of a county palatine was supreme in his domain like a king in his palace. X

### **9. Why are sheep put to graze in fields when the herbage is too scanty for other farm animals to eat?**

Because they nibble the grass, their teeth cutting it off very short. Cows when grazing roll their tongues round the grass, hence it would be manifestly impossible for them to feed on very short grass, which will readily satisfy the wants of sheep.

### **10. Why is the chief church in a place called the "parish church"?**

In olden times the leading church of the parish was the place where business was carried on, meetings were held, education given, and where the criminal took refuge. It was the centre of village life, and the parish was practically under its control.

### **11. What is meant by the term "village wakes"?**

"Village wakes" are fast dying out. Where still in vogue, they are occasions for merrymaking and boisterous fun. Originally they took the form of a festival held in parishes on the anniversary of the dedication of a church to some saint.

### **12. What poem gives an excellent account of rural life in the eighteenth century?**

Oliver Goldsmith's "Deserted Village" gives a graphic account of what village life was like in his day



## *Dummy Windows—Harvest Moon*

(1728→1774). The simple customs and homely characters are portrayed with great fidelity, and stand out in most marked contrast to those which exist to-day.

**13. Many large houses possess “dummy” windows. Why is this so?**

In olden times a tax was put on windows, with the consequence that occupiers and owners sometimes built up windows rather than pay. Large numbers of these windows remain sealed up, reminders of the time when light was not valued at its *true* worth.

**14. What is meant by the “harvest moon”?**

The “harvest moon” is the full moon which appears nearest the autumnal equinox. Her path at that time is less inclined to the horizon than at any other time of the year in our hemisphere. Hence she rises for several nights with little retardation. For this reason we enjoy a succession of moonlit evenings, when farmers are able to work in the harvest field.

**15. Which animals can eat thistles, nettles, etc., without discomfort, and why?**

Animals which feed on grass and hay have specially strengthened membranes of the mouth, and do so without pain or discomfort. The delicate membrane which lines the mouths of human beings and animals which live on soft foods prevents them from eating anything like hay. The mouth of the donkey is very tough, and it feeds on thistles with impunity.

**16. Explain the reason for the presence of so many hawthorn hedges in country districts.**

Birds are very fond of haws, the fruit of the hawthorn. When fields were first enclosed and artificial fences were erected, birds carrying the fruit of the

## *Nursing Associations—Dog—Duck*

hawthorn perched on these fences and dropped the seeds which germinated. The resulting bushes formed many of the hedges which now mark the landscape.

**17. Many country villages are miles away from the nearest doctor's residence, and experience some difficulty in securing the attendance of a doctor in case of sudden illness. What means are taken to obviate this difficulty ?**

In many remote country villages "nursing associations" have been formed, and by co-operative means nurses have been engaged to help in the work of giving "first aid" and advice, until the services of a medical practitioner can be secured.

**18. A man goes for a country walk. What instrument must he take with him, if he wishes to know the exact distance travelled ?**

A pedometer records distances measured in walking. A favourite type, used by officials to county councils, etc., is shaped like a watch, and the motion of the body causes a pendulum to register the distance covered, on the dial of the instrument.

**19. Why does a dog turn round before it lies down ?**

Before the dog was domesticated it slept in the woods. Before it could settle down it had to clear the ground of obstruction. This it did by a motion of the body—a habit which remains.

**20. How is it that a duck keeps warm and dry when in the water ?**

For the same reason that a fisherman keeps warm and dry when securely clad in sou'-wester and oilskins. The duck secretes a greasy substance which forms a coating for its plumage. The water will not mix with oil, and consequently it runs off.

## XI.—THE DOCKS AND SHIPPING.

**1. What advantage has the steam turbine over the steam engine ?**

In the steam engine the backward and forward motion of the piston-rod is changed into one of turning by means of the connecting rod. A great deal of friction has to be overcome at the joints which connect the parts which effect this change. Thus a great loss of energy is incurred. In the steam turbine, the steam causes the parts upon which it acts to rotate. There is no to-and-fro motion to be converted, so that the whole force is used as driving power.

**2. Why is the hull of a ship of paramount importance ?**

Because it has such a great influence upon the working of the ship as a whole. It controls the depth at which the vessel will float, and its stability during a storm. The capacity for carrying both cargo and passengers depends largely upon its design, and the force required to drive the ship also depends on the shape and size of the hull.

**3. What is meant by a " dry dock " ?**

This is a dock into which vessels are taken when they are in need of repair or overhauling. It is fitted with water-tight gates, and after the vessel has been docked, these gates are closed and the water remaining in the dock is pumped out. The vessel is then left high and dry, and every part is accessible.

**4. What precautions have to be taken before a " liner " can be built ?**

The " stand " on which the liner is to rest must be firm and unyielding. Hence for months before the keel is actually laid, men are often engaged in driving thousands of piles into the ground upon which the liner is to be built, as a foundation.

## *Shipbuilding—Cargo—Ballast*

**5. How are the massive plates and ribs lifted into their places when a "liner" is being built?**

Alongside the ship giant cranes are erected, and these lift and lower the plates into the positions required. The cranes travel on lines laid along the sides of the vessel. Floating cranes also are available for use whenever possible.

**6. Why are large ships fitted with double bottoms?**

Should the outer one be damaged by coming into contact with rocks, sandbanks, or icebergs hidden from view, the inner floor will prevent the water from rushing into the ship. This may save it from sinking.

**7. What is meant by a ship "breaking its back"?**

Occasionally when ships are very heavily loaded and they run aground or strike an obstruction under water, the impact is so terrific that the keel which is stiff and inflexible breaks, and the ship is lost.

**8. Why is a boat built with her stern towards the water?**

The stern of the ship is very heavily weighted owing to the great size of the stern post, which is usually of steel, and the rudder. When the time arrives for launching, the stern end enters the water first and balances and steadies the ship at a most important moment.

✓ **9. What happens to a ship when she is relieved of her cargo?**

As the cargo is removed the ship gradually rises out of the water, the water line showing the rise, and becomes "light." This loss of weight can be made good by pumping salt water into the tanks which are placed between the two bottoms of the ship, the water acting as "ballast."

## *Storing Water—Launching*

**10. What provision is made in a ship for storing fresh water for the boilers ?**

The space between the outer and inner bottoms of the ship, is used for storing fresh water for the boilers. In case of oil-driven steamers, oil is also stored there.

**11. Owing to a collision a hole is torn in the side of a ship. What provision is made to prevent the ship flooding with water ?**

In case of emergency, doors connecting different compartments of a ship can be closed automatically from the captain's bridge by the aid of water-power. Should there be any one in such compartments, gongs are sounded to warn the occupants that the doors are to be closed. If a hole be made in the side of a ship and one or two compartments be filled with water, the remaining compartments can be cut off so that the water cannot enter them.

✓ **12. A vessel is about to be launched. What is done to enable the vessel to leave the slips ?**

Iron blocks which hold the vessel in position can be dropped out of place by the movement of a lever. Oil and grease are applied freely to the slips on which the boat rests to make it move more readily. At a given signal the lever is pressed, the iron blocks drop down, and the vessel moves down the slips. As she starts a bottle of wine is broken on the side of the ship and she is duly "christened." Generally a gun is also fired as the vessel takes the water.

**13. A vessel is moored alongside the landing stage. How is she assisted in getting away from her moorings ?**

The greatest care and skill must be exercised in either bringing a large liner up to, or taking her away from a landing stage. Tugs are used to assist ships to get away

## *Embarking—Port-holes—Wireless*

from their mooring safely, until they are able to proceed under their own steam and have sufficient room in which to navigate freely.

### **14. What arrangements are made for passengers embarking and disembarking ?**

When the tide is sufficiently high vessels often land their passengers at the landing stage. At other times they disembark in the docks. Movable gangways are used, and these are so arranged that vessels of the largest size can be entered or left by the passengers with ease and comfort.

### **15. What is the use of " port-holes " ?**

Port-holes are small circular-shaped windows placed in the side of a ship. They are used for light and ventilation.

### **✓ 16. How can a message be sent to a person on board a liner in the open ocean ?**

All modern vessels of any size are fitted with wireless installations. Messages can be received and sent out or exchanged with other ships fitted up in the same way. The messages can be sent or received through any post office doing telegraphic business. These post offices are in touch with wireless stations, in different parts of the country.

### **17. A person is anxious to know whether a vessel has arrived at a certain port. How can he find out ?**

All the leading daily newspapers give a list of sailings, arrivals, etc., and it is quite easy to trace the progress of any passenger vessel as she pursues her course in normal times. Such lists are suspended in time of war.

## *Flag—Chronometer—Latitude*

**18. How can you tell to which nation and to what company a vessel belongs ?**

All vessels fly the flag of the nation to which they belong. The designs of the flags vary according to the nature of the work undertaken. In the case of merchant ships the flag of the company to which they belong is also used, and in some cases the funnels are marked in such a way that the company owning the vessel is thereby recognized.

**19. What is a chronometer ?**

A chronometer is a very accurate and well-made watch, and is used by captains of boats in helping to determine the longitude of the place in which they are. A chronometer is set to Greenwich time and during the whole of a voyage keeps that time. In order to find his longitude the captain ascertains when the sun has reached its highest point in the place where he is carrying out the observation. The exact moment is noted and the chronometer is consulted. For example, it might happen that midday on the ship occurs when the chronometer shows 3 o'clock Greenwich time. As the earth takes four minutes to turn through a degree of longitude, this difference of three hours will represent a difference of  $180 \text{ minutes} \div 4 \text{ minutes} = 45 \text{ degrees}$ . In this case the ship would be in longitude  $45^\circ \text{ W}$ .

**20. How is the captain of a ship able to tell in what latitude he is sailing ?**

The latitude of a ship is discovered by observing the altitude of the sun by means of a sextant. At midday a captain finds out exactly the angle formed by lines drawn from the point of observation to the horizon and the sun respectively. Suppose this angle be  $30^\circ$ , he will then be in latitude  $90^\circ - 30^\circ = 60^\circ$ . But this is assuming that the sun is always in the position, in which

## *Latitude*

it stands, at the equinox—overhead at the equator. But the sun is not always overhead at the equator, so allowance must be made for its apparent change of position. The captain of a ship is always provided with an almanac, called “The Nautical Almanac,” from which he can learn what allowance must be made on any day of the year for the sun’s declination. If he is sailing in the *northern* hemisphere he must *subtract* the number of degrees of declination from the angle between the sun and the horizon when the sun is in *north* declination (March 21st to September 21st), and must *add* them when it is in the *south* declination (September 21st to March 21st). If he were sailing in the southern hemisphere, the calculations would be, naturally, reversed.



## XII.—DRESS!

1. Explain the proverb "the apparel oft proclaims the man."

These words are from "Hamlet." They were spoken by Polonius when giving advice to his son Laertes. They mean that a person often shows by his manner of dress what his tastes and inclinations are, and in this way the clothes show the type of man the wearer is.

✓ 2. Why are different forms of dress used in different climates?

The chief use of clothing is to help to keep the temperature of the body uniform. In cold climates we aim at preventing the loss of heat from the body by radiation, and in hot climates clothing is used as a shield and protection against the intense heat of the sun. The material which serves this double purpose admirably is wool. It is a bad absorber and a bad radiator of heat.

✓ 3. Why are light-coloured clothes more suitable for wear in summer than dark-coloured ones?

In summer when the sun's rays are more powerful we need clothing which will reflect the sun's rays instead of absorbing them. Light colours reflect heat rays better than dark colours, and hence summer clothes should be light-coloured. Dark clothes absorb heat and become hot and unpleasant in hot weather.

✓ 4. What are the main objections to the habit of using tightly-fitting clothes?

Tightly-fitting clothes impede movement, and very often so cramp the different parts of the body as to prevent them performing their normal functions. Sleeves are often faulty in this respect and make free and easy movement impossible. In children it is doubly necessary

## *Wool—Linen—Cotton—Flannelette*

to guard against this fault or the proper development of the body may be seriously impeded.

**5. In our climate what material should be worn next to the skin, and why ?**

Wool is best of all for wearing next to the skin. It is a bad conductor of heat, and at the same time does not interfere with the evaporation of perspiration, thus preventing a film of moisture enveloping the body and making a person liable to chills.

**6. What are the reasons why linen and cotton garments should not be worn next to the skin ?**

Both linen and cotton are good conductors of heat because they are closely woven and thus contain little air in the spaces between the threads. They are also non-absorbent of moisture, and on this account should not be worn next to the skin as they induce chills by allowing moisture to collect round the body.

**7. When selecting a garment what points should be borne in mind ?**

(a) It should not be too tight, or shaped in such a way as to change the natural outline of the wearer. (b) It should not contain more material than is necessary as this gives extra weight without any advantage. (c) It should be selected with a view to comfort and expediency—fashion should be subordinated to these.

**8. What is the main objection to the use of flannelette as an article of clothing for children ?**

Ordinary flannelette is largely used because of its cheapness compared with wool. Owing to its great inflammability it is extremely dangerous to young children, many lives having been lost through its use.

## ***"Warm" Clothing—Celluloid***

- ✓ 9. Some people muffle up the neck quite unnecessarily. Which part of the body should be kept consistently warm and dry if colds are to be prevented?

It is more important to keep the feet warm and dry in order to prevent cold and chills. Sailors rarely suffer from colds and chills, yet their necks are incessantly exposed to the weather.

10. Many children are seen in winter to have knees and arms exposed to the weather. What can be said against such a practice?

Children are more liable than adults to take colds and chills because they have a much larger proportion of their bodies exposed, and consequently lose more heat. Unnecessary exposure should be avoided, particularly in winter, or on cold days in summer.

- ✓ 11. Is it right to say an article of clothing is "warm"?

Clothing is often erroneously spoken of as being "warm." It has no warmth of its own, as may readily be proved by wrapping a piece of ice in a blanket. The ice will not become any warmer. A garment which prevents the heat of the body being lost keeps us warm, but it is not warm itself.

12. What objection is there to women wearing celluloid combs in the hair?

Celluloid combs are very inflammable, and deaths have been caused again and again by these combs catching fire. They have even been said to take fire owing to the concentration of the sun's rays. They should be used with the greatest care.

## *Leather Clothing—Tight-lacing—Silk*

- ✓ 13. Why is leather of such great service as an article of clothing ?

Leather more than any other material is impervious to the wind, and hence is very valuable as an article of clothing in countries where severe weather conditions are met with. During the rigours of active warfare, when wet, mud and snow have to be encountered, no material can vie with leather as a protection against these. It is extensively used in such conditions.

- ✓ 14. Which clothes are warmer—loose-fitting ones or tight-fitting ones ?

Garments which fit loosely have a layer of air between them and the skin. As air is a very bad conductor of heat it follows that loose garments are warmer than tightly-fitting ones. For the same reason those of loose texture, having quantities of air in the meshes, are warmer than those made of closely-woven material.

- ✓ 15. Why is tight-lacing very dangerous ?

(a) The organs affected are constricted and often misplaced. (b) The heart's action is impeded. (c) The respiratory organs are adversely affected.

- ✓ 16. Why is it not advisable to wear coloured clothing next to the skin ?

The skin of many persons is very susceptible to disease. In coloured clothing the dyes used are sometimes poisonous and give rise to diseases of the skin.

- ✓ 17. Many ladies affect high-heeled boots and shoes. Is this advisable ?

High-heeled boots and shoes injure and finally destroy the natural arch of the foot, and thus prevent the wearer from walking naturally and gracefully. The gait will lose its lightness and daintiness.

## ***"Waterproof" Clothing—Easy Boots***

**18. What are the main objections to "waterproof" clothing?**

Waterproof clothing prevents the escape of the perspiration of the body. Hence it is unduly hot and in summer time becomes uncomfortable if worn for any length of time.

**19. If a boot is to fit comfortably and give no pain after a long walk, what must be done to ensure this?**

The main points are: (1) The wearer should be able when standing to move the toes with complete freedom. (2) The sole should be so formed that it is considerably in excess of the size of the foot. Most walking boots are characterized by the width of the sole being somewhat greater than the foot of the boot.

**20. Some people have very tender skin. What material should be worn by them next the skin, and why?**

People with tender skin find that wool is too irritating to be worn with comfort. In such cases silk is an excellent substitute. It is a bad conductor of heat, and owing to its smoothness and softness, does not irritate the tenderest skin. Many people use a mixture of silk and wool. This is cheaper than all silk material.

### XIII.—THE FARM.

1. What is meant by (a) arable land ? (b) pasture land ? (c) " being in clover " ?

(a) Arable land is land under the cultivation of the plough. (b) Pasture land is land used for grazing purposes. (c) " Being in clover " means living in abundance or luxury, like cattle in a clover field.

2. What is (a) a small holding ? (b) a peasant farmer ? (c) fallow land ?

(a) A small holding is a plot of land held under a public authority. It is usually worked by the holder in his spare time. (b) A peasant farmer is a small landed proprietor or leaseholder who tills the land himself. (c) Fallow land is land which has been ploughed and left without cropping in order that it may be mellowed by the influences of the weather.

3. What are the main functions of the Board of Agriculture ?

The Board of Agriculture looks after the interests of farmers and gardeners. It collects statistics and other information relating to agriculture ; it carries out the analysis of fertilizers and feeding stuffs ; it gives advice in connexion with the treatment and prevention of disease among growing crops.

4. A tenant has to give up possession of a farm. Can he secure compensation for any improvements carried out during his tenancy ?

By Act of Parliament (Agricultural Holdings Act) an out-going tenant is entitled to compensation from his landlord for all improvements effected in connexion with the holding, and for all outlays made which will benefit future holders, providing he can justly establish such claims.

## *Rural Exodus—Rotation of Crops*

**5. What is meant by the expression "the rural exodus"?**

The "rural exodus" is the movement which took place towards the end of the seventies, when agricultural labourers left the country districts in large numbers and settled in towns where brighter conditions prevailed. Parliament in the meantime has offered inducements to agricultural labourers to remain on the land.

**6. What circumstances have caused labourers to leave agricultural employment?**

The enormous growth of the mining industry, the prosperity of their town neighbours, the great development of travelling facilities, the higher wages paid in towns, all combined to induce country workers to migrate to towns.

**7. What is meant by (a) a crofter? (b) a Dutch barn? (c) a steer?**

(a) A crofter is a small farmer. The name is usually applied to the small farmer in the Highlands of Scotland. (b) A Dutch barn is a roofed building with open sides, used for storing hay, grain, crops, etc. (c) A steer is a young ox.

**8. What is meant in farming by the four-course system of rotation of crops?**

This is a system which is in almost universal use and aims at securing the best possible yield from the soil. It was found that if the same kind of crop were sown or planted year after year, the yield fell off and the land became tired. After much experimenting the four-course system of rotation was settled upon. In successive years the following crops are sown: wheat or oats, roots, barley, clover.

## *Manures—Self-binder*

**9. Why is ordinary farmyard manure preferable to all other forms of fertiliser ?**

Farmyard manure contains practically all the food that crops require. It is bulky and opens up the soil and helps to bring it into good condition. It forms a store of food which will be of use for future crops. No other form of manure has all these qualities.

✓ **10. Why are farmers very often noticed ploughing as soon as the corn crops have been gathered ?**

This is done to expose the under part of the surface soil to the influence of the sun, air, and rain, in order that when the new seeds are sown the soil will be able to retain moisture for the growing plants, admit air and enable the roots to secure a firm hold of the ground, and so force their way to the light without too great an effort.

**11. What is a self-binder ?**

• A self-binder is a machine which cuts the standing corn, binds it with string into bundles called sheaves, and then drops them on the ground at even distances apart. The sheaves are then collected and put up into shocks or stooks to dry.

✓ **12. What is meant by green manures ?**

Farmers frequently grow green crops such as vetches, rye, and mustard, and then plough them into the land. These crops have the power of "fixing" the free nitrogen of the air, which can then be utilized by succeeding crops. Crops which require such supplies follow the "green manure."



## *Bedding Straw—Digger—Wood Pigeon*

✓ 13. What kind of straw is best for bedding purposes, and why ?

Wheat straw being harder and more bulky than either barley or oat straw absorbs much moisture, and keeps animals healthy and clean. When chopped up, wheat straw is not so good for food as either barley or oat straw.

14. What is a digger ?

A digger is a cultivating instrument, fast coming into use, which pulverizes the soil by means of a series of revolving blades, thus forming a seed bed.

✓ 15. When a ploughman commences to plough a large piece of land why does he set out furrows at some distance apart from one another ?

This practice gives him plenty of space at the ends of his furrows in which to turn round. He comes up along one furrow and goes down along another.

16. What bird plays the greatest havoc with the farmer's seed crops ?

Of all birds the wood pigeon plays the greatest havoc with the seeds sown by the farmer. Enormous quantities of grain have been found in the crop of this bird. In order to lessen its depredations farmers form shooting parties with the sole object of keeping them down.

17. What artificial manure has brought about a remarkable improvement in the permanent pasture lands of Britain ?

Basic slag is now used regularly and systematically on permanent pasture land. It is applied at the rate of 5 to 10 cwt. per acre in autumn, and has resulted in many cases in bringing about a remarkable improvement.

## *Small Holdings—Healthy Stock*

**18. What provision is made to enable workmen desirous of cultivating land in their leisure time to secure suitable plots ?**

The Small Holdings Act confers power on county councils to secure land with a view to providing workmen with small holdings, which they are able to cultivate in their spare time.

**19. How are stock breeders assisted in keeping a healthy stock of animals on their farm ?**

It is illegal for diseased animals to be imported into the United Kingdom. This restriction has done much to protect and encourage breeders of stock.

**20. What practice is often followed by farmers to save time in carting roots into the farmyard ?**

Many farmers now fold their sheep in the fields where the root crops actually grow. The roots are pulped by hand machines. This saves labour and time. As it is winter time when this is done the plan is almost impossible on heavy or low-lying land. The sheep contribute manure to the land, and as the fold is moved from time to time, the land reaps decided benefit.

## XIV.—FIRST AID.

- ✓ 1. A person is taken suddenly ill with severe abdominal pains. What simple method could be adopted to alleviate the pain ?

In cases of this kind the application of heat very often has a soothing effect, and at any rate can do little harm. An india-rubber hot-water bottle is useful. Many people keep "bran bags" ready in case of emergency. The advantage of hot water is that it remains hot for a considerable time.

- ✓ 2. Explain how you could readily devise an emergency stretcher in case of accident.

An emergency stretcher can be made by buttoning up a man's coat and passing two broom sticks or walking sticks through the inside of the coat. Small doors and gates may also be used.

- ✓ 3. A person breaks a limb. State what you would do as a temporary measure ?

Fix the limb so that no movement can take place between the fractured ends. This can best be done by putting splints made of any stiff material along each side of the limb. They should be broader than the limb and should be long enough to pass beyond the joints above and below the fracture. They can be fixed by means of handkerchiefs.

4. A woman is in doubt as to whether her child is fit to leave the house because of fears of her "temperature." What could she do to settle the matter ?

She could readily ascertain the exact temperature of the child by taking a clinical thermometer, placing it underneath the child's tongue and allowing it to remain there for a couple of minutes. If it records anything above  $98.5^{\circ}$ , the normal temperature of the human body, it would be safer to keep the child indoors.

## *Infectious Diseases—To Stop Bleeding*

5. When any one is taken suddenly ill inside a public building and has to be carried out, how can two persons best do this ?

If two people cross their hands and then join them, the right hand of one person grasping the left hand of the other, and *vice versa*, a seat will be formed. On this seat a person can very easily be carried a considerable distance.

✓ 6. State a simple precautionary measure to be taken in visiting a district where an infectious disease is prevalent.

When such diseases as influenza are prevalent in a district, it is wise to wash out the mouth with a weak solution of disinfectant. In this way the germs are often prevented from giving rise to the disease.

✓ 7. People sometimes die by taking poison accidentally. What should be done to prevent such accidents occurring ?

Bottles containing poisons should on no account be kept in the same medicine chest as those containing preparations to be taken internally. There is always the danger, particularly in the night, of the wrong bottle being taken. If possible bottles containing poisons should be of a distinctive shape.

✓ 8. State what measures should be taken when a person is losing blood from a wound caused by cutting.

In slight cases of bleeding place the finger over the cut and after a few minutes put on a plaster or bandage. In cases of severe bleeding, when the blood is bright red (that is arterial), pressure must be applied immediately between the wound and the heart to stop the supply of blood. This can best be done by applying a knotted handkerchief, twisted by means of a pocket knife, so that the knot may press in the proper place. In the case of venous bleeding (the blood is dark red) the pressure should be applied below the wound away from the heart, and the limb should be raised.

## *Apparently Drowned—Dog-bites*

✓ 9. What steps should be taken to restore a person apparently drowned ?

The person should be laid flat on his back, his head being supported by a cushion. The arms should then be grasped above the elbows, they should be drawn steadily upwards above the head, and kept there for two seconds. The arms should then be lowered, and pressed firmly against the sides. These two movements produce inspiration and expiration respectively. These movements should be repeated fifteen times per minute for no less than half an hour.

✓ 10. Bleeding from the nose often proves very troublesome. In case of an attack what steps should be taken to stop it ?

The patient should be placed with head over chair back and a wet sponge applied to the back of the neck. Cold water cloths should also be put on the nose and forehead. In severe cases the nostrils should be plugged with cotton wool.

✓ 11. What would you do in case of a dog-bite to prevent serious after effects ?

The wound should be held under running water and afterwards sucked to extract the poison. Iodine should then be applied, and the wound covered with antiseptic wool and bandaged.

✓ 12. When a person has been stung by a wasp or bee, what may be done to alleviate the pain ?

If the sting still remains in the flesh it should be extracted by using a watch key. Place the barrel over the sting and press it, thereby causing the sting to be exposed and enabling it to be removed. A weak solution of carbonate of soda should then be applied.

✓ 13. An infectious disease occurs in a house. How

## *Ringworm—Fainting—Emetics*

would you arrange to isolate the patient if there are no facilities available elsewhere ?

A room at the top of the house should be selected, and no other room on that floor used. The door should be curtained off by means of a sheet kept saturated with a good disinfectant. The room should have a fire burning in it if possible, and the windows should be kept open. All unnecessary furniture, hangings, etc., should have been cleared away. The staircase should be kept thoroughly ventilated, and one person should take entire charge of the sick person.

**14. What should be done when ringworm attacks a person ?**

The parts affected should be painted with tincture of iodine. The hair should be cut away for a little distance round the wounds where necessary.

✓ **15. Fainting often occurs in close rooms. What should be done in such a case ?**

The patient should be laid flat on the back with the head low. The clothing should be unfastened round the neck, chest, and waist. The forehead should be bathed with cold water and a little water should be sprinkled on the face. Smelling salts may be applied to the nose.

✓ **16. A person is found to have taken poison. What action should be taken if it is known what poison has been taken ?**

The first thing to do is to send for the doctor. Failing his arrival, the first aim is to get the poison out of the system as quickly as possible. This may be done by giving an emetic of mustard and water, or a fairly strong solution of salt, or warm greasy water. In addition the throat may be irritated by means of a feather or the finger tips. In certain cases it would be unwise to ad-

## *Concussion—Epilepsy—Burns—Sprains*

minister an emetic, for example, when poisoning is caused by mineral acids, etc., which corrode the stomach. Medical advice must be obtained in such cases.

**17. After an accident a person is found to be suffering from concussion. Outline the treatment which should be adopted.**

The patient should be put to bed and wrapped in warm blankets. Hot water bottles may be applied to the feet. Should consciousness lapse, medical advice should be obtained

**18. A person is seized with an epileptic fit. How should he be dealt with ?**

All tight clothing should be removed from the neck, and means taken to prevent the patient injuring his tongue by biting it—a cork or similar article should be inserted between the teeth. The wrists and ankles should be secured to prevent the patient from knocking himself against furniture, etc.

**✓19. In case of severe burns what should be done at once ?**

Bathe the wounds with a strong solution of carbonate of soda, and place over them strips of linen soaked with carron oil. Next place cotton wool over the linen strips, and finally bandage. Stimulants, such as very strong hot coffee should be given.

**✓20. A person severely sprains a joint. What means should be taken to lessen the pain ?**

Allow cold water to run on the affected part for five minutes three times a day. Bandages soaked in ice-cold water may be bound round the part. After the first day cold-water treatment must cease and hot-water fomentations should commence. The limb must be bandaged firmly in all cases.

## XV.—FLAGS, BADGES, &c.

- ✓ 1. Before flags came into use, what means were adopted to serve the purpose for which they are now used ?

The Romans carried a figure of an eagle as their war standard; the Greeks used the owl; the Egyptians carried pictures of their gods and sacred animals before them as they marched into war. In later years these devices were supplanted by flags which enabled troops in battle to recognize their colleagues and to rally round them thus preventing confusion and uncertainty. The earliest flags used in our own country were of a religious character and usually bore a cross, as in the case of the early crusaders who adopted the red cross of St. George, their patron saint.

2. What do you know of (a) the Royal Standard ?  
(b) an ensign ?

(a) The Royal Standard, the personal flag of our Sovereign, is divided into four quarters, the first containing the three lions representing England. The second quarter bears the rampant lion of Scotland. The third quarter shows the harp of Ireland. In the fourth quarter the three lions of England are repeated. Wales is not specially represented as she is considered as part of England. The Royal Standard is flown where the Sovereign is in residence and on certain fortresses.

(b) An Ensign is a distinguishing flag or banner, and is flown at the mizzen peak, or on the ensign staff of a vessel.

3. What country is associated with the " Old Glory " ?  
Give a short account of its design and history.

" Old Glory " or the " Stars and Stripes " is the national flag of the United States. It contains thirteen horizontal stripes, red and white, alternately, reminiscent



## *Pennants—Naval Flags*

of the thirteen States of the Union which was formed in August, 1777. In the upper canton nearest the staff are a number of white stars—one for each State of the country as at present constituted—on a blue ground.

The “Union Jack” of the United States is a blue flag with white stars—one for each State.

**4. What is (a) a broad pennant? (b) a pennant? (c) a canton of a flag?**

(a) A broad pennant is a flag which narrows towards the fly and which has a triangular piece cut out of its outer end.

(b) A pennant is a long narrowing strip of bunting which is flown at the mast-head of a man-of-war. It is flown when a captain or lower officer is in charge.

(c) In an ensign or flag the canton is the rectangular part next to the staff in which the union or other device is shown.

**5. What distinguishing flag is flown by (a) an admiral? (b) a vice-admiral? (c) a rear-admiral?**

(a) An admiral uses the flag of St. George, a white flag with an upright red cross on it. It is flown at the mainmast at the upper extremity, or if the ship has less than three masts it is flown at the top of the loftier of the two.

(b) A vice-admiral flies a similar flag with a red ball in the upper canton next the staff.

(c) A rear-admiral flies a similar flag with a red ball in each of the two cantons next to the staff.

**6. What do you know of the white ensign?**

The white ensign is a white flag bearing the cross of St. George with the Union Jack filling the upper canton next the staff. It is the special prerogative of the Royal Navy although the Royal Yacht Squadron is specially

## *Merchant Flags—Tricolour*

privileged to fly it. When going into action more than one white ensign is flown for fear one should be shot away.

**7. How are ships of the merchant service of Britain distinguished ?**

The ships of the British merchant service fly the red ensign. It is a plain red flag with the Union Jack occupying the upper canton next the staff.

**8. What is meant by (a) "dipping the flag" ? (b) "striking the flag" ?**

(a) Lowering and then hoisting the flag as a mark of respect. (b) Lowering the flag as a sign of surrender.

**9. On what ships is the blue ensign flown ?**

The blue ensign is a plain blue flag with the Union Jack filling the upper canton next the staff. It is the distinctive mark of the Royal Naval Reserve, although a few yacht clubs such as the "Royal Albert," "Royal Cinque Ports," "Royal Clyde," are privileged to carry it.

**10. Say what you can about "the Tricolour of France."**

The French Tricolour has three vertical bars: blue, white, and red (reading from the flag staff). Since 1789, the year of the French Revolution, it has been in use both in the navy and mercantile marine.

**11. Amongst the flags flying on the ships lying in a certain port were the following :—**

- (a) A yellow flag traversed by two horizontal red bars.
- (b) A red flag with a blue cross, bordered with white.
- (c) A blue flag with a yellow cross.
- (d) A flag with green, white, and red vertical stripes, with the device of a shield on the central bar.
- (e) A flag bearing a red central disc, with alternative red and white rays.
- (f) A red flag with a white upright cross.
- (g) A flag with red, white, and

## *Fleur-de-lys—Flag Significance*

blue horizontal stripes (reading downwards). (h) A flag made up of blue and white horizontal stripes, with a white cross on a blue ground in the upper canton nearest the staff. To what countries did they respectively belong ?

(a) Spain. (b) Norway. (c) Sweden. (d) Italy.  
(e) Japan. (f) Denmark. (g) Holland. (h) Greece.

### 12. What do you know of the " fleur-de-lys " ?

The fleur-de-lys, which was for many years the emblem of the kings of France, is supposed by some to represent a lily, by others an iris, and by others the head of a lance. It frequently occurs in heraldic devices in England and Scotland and generally refers to France. After 1789 it was no longer used by the people of France.

### ✓ 13. What do the following flags signify : (a) a white flag ? (b) A black flag ? (c) a white flag with a rectangular blue centre ? (d) a white pennant with a red disc ? (e) a blue pennant with a white disc ? (f) a quartered yellow and black flag ?

(a) A white flag denotes surrender. (b) A black flag used to be the mark of a pirate ship or craft. (c) This signifies, in the British merchant navy, that a pilot is required. (d) In the international code of signals for ships it denotes the letter "C" or "Yes." (e) This represents the letter "D," or "No." (f) This flag denotes quarantine and indicates that yellow fever, cholera, or plague has attacked some one on board.

### ✓ 14. How do ships indicate, when they are in distress and need help ?

(a) The "S.O.S." signal is sent out if the vessel is fitted with a wireless installation ; or (b) A gun is fired at intervals of a minute ; or (c) The international code signal of distress (flags N.C.) is hoisted.

At night time in addition to (a) and (b) above, a

## *Emblems and Devices—Colonial Flags*

barrel of oil or any inflammable material is lighted on the ship, and rockets are sent up one at a time at short intervals.

15. With which countries are the following emblems associated :—

(a) The maple leaf ? (b) The springbok ? (c) The chrysanthemum ? (d) The kangaroo ? (e) The thistle ? (f) The lily ?

(a) Canada. (b) South Africa. (c) Japan. (d) Australia. (e) Scotland. (f) France.

16. What are the characteristic features of the flags of (a) India ? (b) Canada ? (c) Australia ?

(a) The flag of India consists of the Union Jack surmounted in the middle by the Star of India set in a golden sun, surrounded by the motto "Heaven's Light our Guide."

(b) The flag of Canada consists of the red ensign, with a shield containing the emblem of each colony in the Dominion.

(c) The flag of Australia consists of the blue ensign on the ground of which are found the large star of the Union and the Southern Cross, which is visible in the Australian sky.

17. Which flags of our colonies bear the following devices :—

(a) A golden lion ? (b) A fortress with an arched gateway under which is a key ? (c) Three lions ? (d) Three armour-clad legs ? (e) An elephant and a pagoda temple ? (f) A Chinaman holding out a hand of welcome to an Englishman, a trading ship, and Chinese junks ? (g) Stars of the "Southern Cross" with red centres ? (h) British crown and the words "Terra Nova" ? (i) An elephant and a palm tree ? (j) A sailing ship, the Union Jack, and a set of woodcutter's tools ? (k) A rocky

## *Badges of Rank—Naval and Military*

island with an old sailing ship approaching ? (l) An ox with a ship off the shore ?

(a) British South Africa—representative of the mineral wealth of the country. (b) Gibraltar—representing the “key to the Mediterranean.” (c) Channel Islands—our oldest possessions. The three lions formed the Royal Arms of England in early times. (d) Isle of Man—this is an ancient emblem of the Manx population. (e) Ceylon—reminding us of its life and customs. (f) Hong Kong—our possession in China. (g) New Zealand—differs from that of Australia in that the stars have red centres and the large star of the Union is absent. (h) Newfoundland—the words “Terra Nova” denote “New Land.” (i) Sierra Leone, Gambia, and Gold Coast—representing the ivory and palm oil. (j) British Honduras—emblematic of the wood which the colony exports. (k) St. Helena—a characteristic device. (l) Falkland Isles—representing the cattle breeding of the colony.

18. What military ranks do the following badges denote :—

(a) A lion surmounting a crown, supported by crossed batons, surrounded by circlet of laurel leaves ? (b) A crown above two stars ? (c) A crown on shoulder strap ? (d) Four stripes, point upwards ? (e) Three stripes with crown ? (f) Black Maltese cross, and crown on cap ? (g) Crowned wings on left breast ? (h) Crossed rifles beneath a crown ? (i) A coloured design at top of left sleeve ? (j) Khaki bomb with red flames ? (k) A chevron with point up on lower part of left arm ? (l) A red brassard bearing letters P.M. in black ? (m) A white band round the cap ?

(a) Field marshal. (b) Colonel. (c) Major. (d) Quartermaster sergeant or first class staff sergeant, R.A.M.C., or sergeant bugler, drummer or piper. (e) Squadron,

## *Badges of Rank—Naval and Military*

battery, troop or company sergeant-majors. (f) Chaplain. (g) Flying pilot. (h) Marksmanship badge. (i) Battalion mark. (j) Service bomber. (k) Good conduct badge. (l) Provost marshal. (m) Cadet officer.

19. What badges are worn respectively by the following naval officers :—(a) Admiral ? (b) Captain ? (c) Lieutenant ? (d) Engineer officers, medical staff, and paymasters ?

(a) Three narrow stripes of gold braid and one broad stripe on sleeve. The peak of the cap is bordered all round with oak leaves and cap badge consists of anchor entwined surmounted by Crown.

(b) Four narrow gold stripes on sleeve. Badge is as usual, with cap peak bordered only on lower edge.

(c) Over eight years' service—two stripes of gold braid with a very narrow stripe between ; under eight years' service—two stripes of gold braid, peak of cap plain. Engineer officers wear the same stripes, etc., as ordinary officers of equivalent rank, but they have in addition purple stripes between the gold ones. Medical officers have red stripes, and paymasters white between the stripes.

20. What do the following naval badges denote :—(a) Crossed flags with one star above ? (b) Wings with one star above ? (c) Propeller ? (d) Crown above crossed anchors ? (e) N.P. and crown ? (f) Hammer and hatchet, crossed ?

(a) Signalman. (b) Telegraphist. (c) Stoker. (d) Petty officer (first class). (e) Naval police. (f) Artizan (blacksmith, plumber, painter, etc.).

## XVI.—FOOD.

- ✓ 1. What are the four great classes into which food can be divided ?

The four great classes are: (a) Nitrogenous foods or flesh-formers, so called because they either build up new body tissues, or repair bodily waste. (b) Hydrocarbons or fats which help to maintain bodily heat and produce energy. (c) Carbohydrates or starchy foods which also help to maintain the heat of the body as well as to form fat. (d) Minerals, including water and salt, are essential for the repair and growth of all parts of the body.

- ✓ 2. What are the main functions performed by food ?

The functions of food are: (a) To build up the tissues of the body. (b) To repair waste tissues. (c) To produce energy. (d) To maintain the heat of the body.

- ✓ 3. Why is it necessary for man to live on a mixed diet ?

Experiments have proved that an average man gives off 307 grains of nitrogen and 4,700 grains of carbon daily, and if he wishes to maintain his health this waste must be repaired. If he attempted to make up this loss by using one kind of food alone, it would be necessary to take much larger quantities of it than would be either palatable or economical. For example, suppose a man took nothing but bread. To obtain the 307 grains of nitrogen he would have to take more than four pounds, but by so doing he would consume 9,000 grains of carbon, nearly twice the quantity required. To obviate this a mixed diet is adopted. In this case 2 lb. of bread and  $\frac{3}{4}$  lb. of meat would supply the man's daily requirements exactly.

## *Salt—Fruit and Vegetables*

### **4. Of what use is salt as an article of food ?**

The complete withholding of ordinary salt from a person's diet would lead to fatal results. Salt is the source of the hydrochloric acid of the gastric juice, without which digestion would be seriously impaired. It also aids in the solution of albumin and increases the flow of the saliva.

### **5. Why are fruit and vegetables necessary as a part of our ordinary diet ?**

Fresh vegetables and fruit contain salts of potash. It is found that the absence of these salts from any dietary for any length of time leads to a marked weakening of the blood, and results in the disease called scurvy, prevalent in former times amongst seafaring men. These salts assist materially in purifying the blood.

### **6. What disadvantages follow from eating at too frequent intervals ?**

An excess of food generally results in an accumulation in the bowels, resulting in digestive derangements, including dyspepsia, constipation, diarrhœa. Too much strain is also put upon the digestive organs, and frequently large quantities of food pass from the body totally undigested.

### **7. Why is much of the food we eat better when cooked ?**

(a) The food is rendered more pleasing to the eye. (b) It is more agreeable to the taste. (c) Cooking has the effect of killing any dangerous germs or parasites existing in the food. (d) The food is easier to masticate.

### **8. What ill effects frequently follow deficiency in quantity of food eaten ?**

(a) The tissues of the body lose their vitality. (b) The blood becomes poor. (c) Mental and physical weakness



## *Vegetarians—Meat—Warm Food*

follow. (d) The organs soon fail to perform their functions satisfactorily, resulting in illness.

### 9. What is a vegetarian ?

A vegetarian is a person who lives on vegetable products alone and avoids all forms of meat. Although it has been proved that this is quite possible a moderate amount of animal food seems to agree with most people.

### ✓ 10. What are the chief characteristics of good meat ?

(a) It should be firm and elastic to the touch. (b) It should be bright red in colour and marbled in appearance. (c) It should have a fresh pleasant smell. (d) The fat should be whitish yellow in colour and free from blood stains. (e) If a skewer be thrust into it, there should be no unpleasant smell when it is withdrawn.

### 11. Why is mutton more suitable for sedentary workers than beef ?

Mutton is more easily digested than beef and more delicately flavoured.

### ✓ 12. Why is warm food to be preferred as a rule to cold food ?

Warm food is more easily digested than cold food because the digestive juices can penetrate the grains of food more easily than in the case of cold food. It also exerts a tonic effect on the system, and stimulates the digestive organs into action.

### 13. Why is it necessary that pork and other kinds of meat should be well cooked ?

It is almost impossible to over-cook some forms of meat, especially pork. If they are not sufficiently cooked

## *Fish—Eggs—Milk*

- parasites which may be present and which are capable of giving rise to various forms of disease, may pass into the human system.

✓ 14. In buying fish what points should be specially noted ?

(a) It should be ascertained whether the fish is in season. Out of season (that is during spawning time) they are generally unfit for food. (b) The eyes and gills should be bright and the flesh firm. (c) If the scales rub off easily it is indicative of staleness. (d) If the tail droops this is also a sign that the fish is not fresh.

15. What shell fish are easily digested and which are very indigestible ?

Oysters when eaten raw, and in season, are the most easily digested of all fishes. They are not in season during May, June, July, and August. Crabs, lobsters, and mussels are very indigestible as they are all foul feeders, particularly mussels, which are frequently poisonous when taken from stagnant water where there is sewage.

✓ 16. Explain a simple method of testing the freshness of eggs ?

Bad eggs will float if they are placed in a solution of salt and water composed of two ounces of common salt and a pint of water. Good eggs will sink.

✓ 17. Why may milk be considered a model food ?

Milk is considered a model food because it contains all the four classes of food necessary for the maintenance of life and for health and growth in the earlier periods of life. It is not so suitable for adults.

## *Lactometer—Condensed Milk—Bread*

18. What is meant by (a) a lactometer? (b) condensed milk?

A lactometer (from Latin lac, milk, and metron, a measure) is an instrument which is used for testing the quality of milk. It floats upright in the milk and the depth to which it sinks indicates the percentage of water in the milk. Condensed milk has had the greater part of its water removed by evaporation, brought about by gentle boiling. In some cases sugar is added. This acts as a preservative.

19. Why is it necessary to keep milk in an airy place?

Milk which is allowed to stand in a warm place absorbs smells and dirt, and rapidly becomes sour and unfit for human consumption.

20. Why is bread made from white wheat-flour considered best for all round purposes?

White bread is more readily digested than wholemeal and brown bread, although it is not quite so nutritious. The particles of bran present in brown bread very often irritate the walls of the stomach and intestines, causing discomfort to those with weak digestive powers. It is hurried along the intestines, and some of the nutriment which it contains is wasted.

## XVII.—FORMS OF ADDRESS, ETIQUETTE.

### 1. What is "the loyal toast" ?

At all public banquets in the British Empire it is the custom of the chairman to ask the guests to fill their glasses with water or wine and drink the health of "The King." In this way we express loyalty to our sovereign, and at the same time, acknowledge that he or she is the head of the State.

### 2. If you are in doubt how to address a man of title what form of address can you use ?

It is never incorrect to address a gentleman as "sir."

### 3. In writing an ordinary business letter to a gentleman how would you begin and end ?

The letter should commence "Dear Sir," and end "Yours truly" or "Yours faithfully." The name and address of the person to whom the letter is written should be placed either at the beginning of the letter on the left-hand side above the "Dear Sir," or at the end of the letter after the signature, on the left-hand side.

### 4. After the King and the members of his own family, what persons officially take precedence in the nation ?

After the King and the male members of his house, the order of precedence is ambassadors, Archbishop of Canterbury, Lord High Chancellor, Archbishop of York, Prime Minister.

## *National Anthem—Forms of Address*

**5. At an outdoor function a band strikes up "The National Anthem." What should those present do ?**

If seated, all immediately rise. Gentlemen take off their hats, remaining uncovered until the air is finished. Service men stand at attention.

**6. When a judge enters the court, what is it customary for those present to do ?**

When the judge enters the court at the assizes, everybody present immediately rises and the men take off their hats as a mark of respect, remaining with heads uncovered during the whole of the proceedings. When the judge is seated they resume their seats. .

**7. How would you address a letter to (a) a major ? (b) a lieutenant in the army ?**

"Major Sir Arthur Davies," or "Major Davies," for example. The professional rank always precedes any other title.

A lieutenant in the army is addressed as "Esquire," *e.g.*, "Arthur Davies, Esq." Only officers above the rank of lieutenant are addressed by their rank.

**8. A witness in court is asked a question by a mayor. How should the latter be addressed in reply ? Similarly how should a judge and a lord mayor be addressed ?**

It is customary to address a mayor as "Your Worship" when in court, but as "Sir" at other times.

A judge is addressed as "My Lord" when on the bench, but as "Sir" at other times. A judge of the county court as "Your Honour" and "Sir." A lord mayor is addressed as "Your Lordship" and "My Lord."

## *Every-day Courtesies—Etiquette*

9. When saying "good morning" what should accompany the greeting?

When one person greets another with "good morning" etc., names should be exchanged if they are known.

10. A man speaks to a strange lady in a railway carriage. How should he address her?

He should address her as "Madam."

11. How should a schoolboy greet a grown-up acquaintance?

He should raise his cap and reply at once to the greeting of his acquaintance.

12. A man is out walking with his wife, and a stranger to him speaks to his wife, what should he do?

He should raise his hat.

13. When is it customary to write a communication in the third person?

Formal invitations are written in the third person as well as acceptances and refusals of such invitations. Sometimes short business letters, and communications on postcards, are written in the third person, and occasionally letters between persons unknown to each other.

14. What is meant by the word "etiquette"?

The word etiquette literally means "ticket" or "label." It is used for the niceties of behaviour which mark or "label" polite people.

## *Forms of Politeness—Street Etiquette*

✓ 15. How is the word "esquire" used in addressing a letter?

"Esquire" shortened to "Esq." is placed after the name when no other title is used. It is placed before initials indicating degrees, distinctions, etc.

16. A person loses an article of jewellery. It is returned by the finder whose identity is not disclosed. What should the recipient do?

The least that could be done would be for the recipient to acknowledge with gratitude the receipt of the returned property through the "Lost and Found" column of the local newspapers.

17. A person is ill and you wish to enquire after his welfare. How can this be done?

An ordinary visiting card with the words "To enquire after Mr. Blank" written above the printed name, would be delivered in person. During convalescence the invalid would send by post a similar card bearing the words "With thanks for kind enquiries" written above the printed name.

18. After spending a holiday with friends, how would you acknowledge their kindness?

Immediately on returning home a letter should be written to your hostess, thanking her for all she has done to make your visit a pleasant and enjoyable one.

19. A gentleman meets a lady of his acquaintance in the street. Who should speak first?

After making acquaintance with a gentleman, the lady should always be the first to bow on meeting him

## *Funerals*

in the street. She would also be the first to offer to shake hands if she feels so disposed.

**20. If a funeral passes you in the street what should you do ?**

You should, if a male, remain with head uncovered until the funeral has passed, as a sign of respect and sympathy.



## XVIII.—THE GARDEN.

1. A man decides to break up some rough, neglected land in order to grow vegetables. Which kinds should be most suitable for cultivation ?

Rough newly broken land is generally full of insect pests, the seeds of weeds, roots of perennial weeds, etc. It is essential to crop it in such a way that the weeds shall be stifled, and the pests drawn off with the crop. The potato, artichoke, brassicas, broad beans, peas, etc., should be planted in preference to small seeds such as the onion, carrot, parsnip, leek, etc. Only when the land has been thoroughly cleaned and subjected to the influences of the weather can these be successfully grown.

✓ 2. Most plants fail to thrive in land deficient in lime. What is the test which shows whether lime is required ?

Take quantities of soil from different parts of the garden, place them in a vessel and dry in the oven. Pour dilute hydrochloric acid over the dry soil. If a brisk effervescence results there is a sufficiency of lime in the soil. Should there be little or no bubbling lime must be applied.

3. What is meant in gardening by "rotation of crops" ?

"Rotation of crops" means varying the crops year by year so that no piece of land is planted in successive years with crops requiring the same kind of food, e.g., pulse crops are frequently succeeded by members of the brassica family, and these by root crops—carrots, parsnips, beet, etc.

## *Intensive Cultivation—Vegetables*

4. Name some garden flowers which thrive in the shade, and others which thrive in the sun.

These include pansies, violas, irises, lily of the valley, mimuluses, primroses, snowdrops, spiræas, foxgloves, begonias.

Those requiring sunny open positions include sun-flowers, geraniums, nasturtiums, and practically all hardy annuals.

5. What is "intensive cultivation"?

This is a system of cultivation practised extensively on the Continent and especially in France. Several crops are grown on the same ground in each year. Heavy demands are made upon the soil, and to counterbalance this, artificial feeding by means of manures is largely resorted to.

✓ 6. What is the best direction to plant rows of vegetables?

If possible the rows of vegetables should run from north to south. Both sides of the rows are then open to the influence of the sunlight.

7. A man requires a screen for his garden. What crop could be grown for this purpose?

In order to break the force of the wind or to act as a screen from the sun there is no better crop than artichokes. Runner beans may be used, but the wind sometimes blows them down.

✓ 8. A man is unable to secure a supply of ordinary farmyard manure. How can he make up for this deficiency?

Dig a hole in the garden in spring and collect leaves, hedge trimmings, road scrapings, harmless weeds, soot, etc. Mix in some lime and pour in slops from the house. In January of the following year dig another

## *Shrubs—Spraying—Seed Potatoes*

pit—called a decomposing pit—and empty the contents of the collecting pit into it. The manure will be ready for use in the autumn. Artificial manures act as stimulants, but they lack the “body” of natural manures.

9. After a very severe winter shrubs growing on a northern slope were found to have suffered less harm than those growing on a southern slope. How can you account for this?

Those on the southern slope would thaw in the day time and freeze in the night; whilst those on the northern slope would be continuously frozen during a severe period. Continual changes are destructive to plants.

10. Why is spraying carried out in the garden? Which is the best kind of sprayer to use?

Spraying is carried out to prevent or check disease or to destroy insect pests. A preparation known as “Bordeaux Mixture” is used for spraying potatoes. This can be bought ready mixed and is applied with the intention of preventing an attack of “potato blight.” Fruit trees are sprayed during the winter months in order to kill any pests or harmful growths on the bark. The commonest form of wash is made of 2 lb. caustic soda mixed with 10 gallons of rain water. This is injurious to the skin, clothing, and eyes, hence it must be used with care. A “knapsack sprayer” which is carried on the back is the most suitable sprayer for ordinary purposes. It is filled with the mixture which is forced through the nozzle in the form of a fine spray. The operator can direct the spray in any direction he pleases.

11. English gardeners planting potatoes prefer either Scotch or Irish “seed.” Explain the reason for this.

(a) They provide a “change” of seed. (b) They are more hardy, coming from more northerly and exposed

## *Onions—Potatoes—Tomatoes—Peas*

districts. (c) They are less liable to disease than home-grown "seed." (d) They are also less mature.

**12. Why is it customary to beat the soil before sowing onions?**

(a) The seeds are thereby brought into closer contact with the moisture of the soil. (b) The "onion fly" finds greater difficulty in burrowing into the soil and attacking the young seedlings.

**13. A potato grower finds that his crop is infested with "wart", disease. What steps must he take under the circumstances?**

The circumstance must be reported at once to the Board of Agriculture, or to one of the officials appointed by the Board to receive such reports. Full name and address should be given, and if possible an infected specimen should be sent with the notification. Failure to report an outbreak of wart disease renders a person liable to a heavy fine.

**14. Mention some points to be borne in mind when growing out-door tomatoes.**

(a) They should be planted in a sunny position—preferably against a southern fence. (b) During the earlier stages of growth manure should be given very sparingly, otherwise the foliage may develop at the expense of the fruit. (c) Buds appearing in the axils of the leaves should be nipped out as they appear. (d) After three or four trusses of bloom have set the top of the plant should be nipped out, so that the strength of the plant may not be wasted on large numbers of badly developed fruit.

**15. How is it possible to secure a supply of garden peas late in the autumn?**

If early varieties of peas are sown in the summer it will be possible to pull peas until quite late into the autumn unless the weather be extremely unfavourable.

## *Hardy Vegetables—Poultry*

16. Which is the best part of the year for sowing the seeds of hardy vegetables?

Plants seed themselves in the autumn and many crops thrive if sown or planted at that time. These include onions, cabbages, turnips, prickly spinach, carrots, broad beans, and lettuce (winter).

✓ 17. What are the advantages of keeping fowls on a section of the garden?

(a) They clear the ground of insect pests and weeds.  
(b) They manure the ground on which they run. (c) Under fruit trees they are doubly valuable. Where fowls are kept fruit trees hardly ever suffer from insect pests.  
(d) The land gets a change, and when cropped again produces good results.

18. How is it that many of the flowers of the marrow fail to result in fruit?

The marrow plant bears both male and female flowers. The male flowers do not bear fruit, and where there is a preponderance of them several should be nipped off. Artificial fertilization may be carried out by means of a camel hair brush, the pollen from the male flower being dusted on the stigma of the female flower.

19. A man decides to grow runner beans but finds he is unable to secure any supports. What should he do?

When the plants are eighteen inches high he should nip out the leading growths and thus cause the plants to become bushy and remain dwarf in habit.

20. Why is it customary to plant an orchard with several varieties of pears, apples, etc., and not with one variety only?

Many good varieties of fruit trees are self-sterile and cross-pollination is necessary if crops are to be satisfactory. Many orchards fail to produce satisfactory crops because of the lack of pollinating insects whose visits result in fertilization of blossoms.

## **. XIX.—HEALTH, HOUSING, &C.**

**1. What is meant by (a) health ? (b) disease ? (c) hygienic principles ?**

(a) Health is that state of the body when all the organs are carrying out their functions in a satisfactory manner. (b) The word "disease" literally means "apart from ease," and signifies that one or more of the organs of the body cannot carry on their work properly. (c) Hygienic principles are those which deal with the preservation of health. The word "Hygienic" is derived from "Hygeia," the Greek Goddess of Health.

✓ **2. What points should be borne in mind with regard to exercise ?**

(a) It should be regularly indulged in and should be as varied as possible. (b) It should be carried out as far as possible in the open air. (c) It should not be carried to excess. (d) It should as a rule take a different form from that which comprises our every-day work. For example, manual workers generally find mental exercise restful and beneficial, whilst those engaged in mental work during the day find that physical work provides change and rest.

✓ **3. Why do we breathe more quickly when indulging in vigorous exercise ?**

After vigorous exercise we breathe faster because the tissues of the body are being used up more rapidly than under ordinary circumstances. Oxygen is required to change these tissues into such a form that they can be carried away by the blood. We breathe in the necessary supplies, by increasing the ordinary rate of respiration.

## *Oxygen in Blood—Lungs*

- ✓ 4. How is it that we are more prone to feel cold when our health is not good ?

When the health is bad the blood circulates less freely. There is not sufficient oxygen carried through the body to perform the work of burning or oxidizing the waste tissues of the body. Hence combustion is retarded and we feel cold.

- ✓ 5. What causes the blood to become dark red and impure as it returns to the heart after its course round the body ?

Carbonic acid, water, and other products are formed as a result of the burning up of the carbon and hydrogen in the body. The blood absorbs these impurities and changes from the bright arterial blood to the dark purple venous blood.

6. What is meant by (a) an inspiration of the lungs ?  
(b) an expiration ?

(a) An inspiration is a breathing in and occurs when the lungs expand. The upward movement of the ribs with contraction of the diaphragm increases the capacity of the chest and air rushes in. (b) When the ribs descend and the diaphragm expands the lungs are contracted and some of the air in the air cells is forced out. This is called an expiration.

- ✓ 7. What advantages follow from healthy exercise ?

(a) It enables the excretory organs, such as the lungs and the skin, to perform the work of clearing off the waste products of the body more readily. (b) It strengthens muscles which otherwise might not be brought into vigorous action. (c) It encourages a brisker circulation of the blood. (d) It aids the digestive organs and helps to tone up the body all round.

## *Walking—Breathing—Games*

- ✓ 8. Why are some people able to walk long distances without being unduly fatigued ?

They have learned to walk properly. Good walkers keep the head erect and their shoulders well back ; they throw the weight of the body on the front part of the foot rather than on the heel ; they walk from the hip rather than from the knee.

- ✓ 9. Why is it better to breathe through the nostrils rather than through the mouth ?

Particles of dirt are arrested in the nasal passage and the air is warmed. Mouth-breathers constantly suffer from throat and lung troubles because they breathe in cold air and particles of dirt.

- ✓ 10. Why should games form an important part of our everyday lives ?

During play parts of the body which are not used at other times are brought into use, and those which are often strained and tired are allowed to rest. Games help us to use our limbs properly, to sharpen our ideas, and to act quickly.

- ✓ 11. Why is fruit frequently eaten at the end of a meal ?

After eating, particles of soft food often remain upon the teeth. By eating hard fruit and vegetables (such as cress), the teeth are cleaned in a natural way and decay of the teeth is checked.

- ✓ 12. Why is it unwise to form a habit of eating between meals ?

¶ The digestive organs, in common with all other organs of the body, need periods of rest. If food is eaten constantly between meals the digestive organs are always at work and digestive troubles result.



## ***Meals—Lighting—Housing***

- 13. What objection is there to drinking large quantities of liquid at meal times ?**

If water or any other liquid be taken in large quantities, the digestive juices become diluted to such an extent that their work is seriously interfered with.

- 14. What form of lighting is the most hygienic, and why ?**

Gas, paraffin lamps, etc., taint the air. Oxygen is used up and carbon dioxide produced. Electric lamps have no effect on the air.

- 15. Why are "back-to-back" houses unhealthy and unsuitable to live in ?**

The healthiest houses are those which are situated so that sunlight and air may have free access. In back-to-back houses through ventilation cannot be obtained. They are necessarily dark, and free circulation of air is impossible.

- ✓ 16. Before building a house or selecting one in which to live, what points should be noted ?**

(a) The aspect in relation to prevailing winds, sunlight, etc. (b) The soil on which it is to be built. (c) The general surroundings.

- 17. What use may be best made of rooms situated on the north side of a house ?**

The rooms which can with advantage be placed on the north side of a house are working rooms. Staircases are also best placed in this position as they are thereby always kept cool. The larder and dairy for the same reason are suitable rooms to place there.

## *Made Soil—Bricks—Damp Courses*

**18. Why is it necessary to be careful when building a house on "made soil"?**

Made soil is composed of rubbish which has been used to fill up a hollow. Such soil is usually rich in organic matter which in decomposing gives rise to injurious gases. The rubbish of which such soil is composed should not be built upon until the sun and air have had free access to it for several years.

**19. Why are glazed bricks most suitable for the inside walls of buildings?**

Glazed bricks are impervious and will not allow impurities of respiration to soak into them. In addition they are easily and thoroughly cleaned. Wall papers are very absorbent, and are consequently not so healthy. The modern practice of varnishing them prevents dirt adhering to them so easily.

**20. Why is it necessary to put a "damp course" in houses?**

The foundation walls of a house sometimes become damp. As bricks are porous this dampness rises into the walls above the ground level. To prevent this a damp course made of some impervious material such as slate, sheet lead, tiles, etc., is laid in the walls a little above the level of the ground. The house is thus kept dry and healthy.

## XX.—THE HOME.

**1. A family leaves home for the summer holidays. What precautions should be taken to safeguard the house ?**

(a) Secure all windows. (b) Turn off gas at meter.  
(c) Acquaint local police, or ask neighbour to keep an eye on the house. (d) Deposit jewellery, valuables, etc., with banker, where necessary.

**2. Picture rails have largely superseded the old-fashioned nail and suspender. What are the advantages of this innovation ?**

(a) They are more convenient and not so unsightly as nails. (b) In putting nails into the wall there was always the risk of perforating gas pipes. (c) They are less likely to result in damage to pictures by suddenly collapsing.

**3. A woman finds on wash day that her supply of clothes pegs has run out. What simple method can she adopt to fasten the clothes to the line ?**

She can use pieces of string. Damp clothes can readily be tied to the clothes line. Our "handy men" adopt this practice when aboard ship, and it is found to be very successful.

✓ **4. A newly-lighted fire often fails to burn up quickly. If no bellows are available, what simple device will assist in making the fire burn more readily ?**

Hold a sheet of paper over the front of the grate. This sends a current of air through the fire from below and it immediately commences to burn vigorously.

## *Leaking Taps—Kitchen Pipes*

5. A tap is leaking. What steps should be taken to remedy this?

The crown of the tap should be unscrewed and taken off. The old "washer" should be removed and a new one of leather fitted. It will greatly facilitate the operation if the other taps are turned on. This relieves the pressure of the water, and the task is greatly simplified. It is better still to turn the water off at the main.

✓ 6. Why is the spout of a kettle always made as high as the kettle itself?

If the end of the spout were below the level of the top of the kettle the latter could not be filled without water running from the spout.

✓ 7. How is it that pipes leading from wash basins, kitchen sinks, etc., have a U-shaped bend in them?

Water rests in the bend and serves as a trap. Smells from drains are prevented from being blown back up the pipes and reaching the house.

8. If such a pipe becomes temporarily blocked how would you remove the obstruction?

The best means to remove any temporary obstruction (such as tea leaves, etc.) is to take an ordinary garden syringe and force a volume of water vigorously through the pipe. Repeat this two or three times. An iron rod often fails to clear a passage.

✓ 9. Why do metal tea-pots, coffee-pots, etc., often have wooden handles?

Metal is a good conductor of heat and a metal handle would quickly become too hot to hold comfortably. Wood is a bad conductor and remains cool even when the tea or coffee is very hot.

## *Plants in Rooms—Colour Scheme*

**10. Why should bedroom windows open inwards instead of outwards ?**

(a) They are more accessible and can be cleaned from the inside. (b) They can easily be regulated and are less exposed to strong winds than when opening outwards.

**11. What is the advantage of having plants growing in a living room or in a conservatory leading into a living room ?**

Plants absorb carbon dioxide from the air of a room during the day. They retain carbon and give out oxygen. Hence they help to purify the air of a room. It is not wise to keep plants in bedrooms. In the dark plants give out carbon dioxide.

**12. Which colour in a living room has a restful effect on the system ?**

The most suitable colour is a quiet shade of green. We see the scheme carried out in billiard saloons, in connection with the "Green Room" at theatres, etc.

**13. What advantage has the electric bell over the ordinary door-knocker ?**

(a) It is pleasanter to the ear. (b) It is heard at the back of the house where a knocker often fails to be heard. (c) It can be connected with all the rooms in the house in addition to the outer door. (d) It is not open to such abuse as a knocker.

**14. Which rooms in a house should be covered with linoleum rather than with a carpet ?**

The kitchen, bathroom, and nursery. Linoleum is easily swept or washed, and is more economical than a carpet.

## *Testing Water—Fireplaces—Papering*

15. If you were living in a house where there were doubts as to the purity of the water supply, what would you do under the circumstances ?

A sample should be sent to the local sanitary inspector, or other suitable person. If impurities are present and there is no other supply available, all water used for drinking purposes should be boiled or passed through a filter. This is generally unnecessary where the water is supplied by a public authority.

16. Why should practically every room in a house be fitted with a fireplace ?

For purposes of ventilation. By this means the air in a room is constantly being changed. The practice of blocking up fireplaces in bedrooms is a most pernicious one. The renewal of fresh air is seriously interfered with, and an excellent natural system of ventilation is destroyed.

17. Before having rooms "papered" what precautions should be taken ?

The old paper should be removed. Layer upon layer of paper is sometimes found upon the walls of houses. This provides a breeding place for disease germs, and prevents the diffusion of air through the walls of the room.

18. In many houses one or two of the upper windows are protected by iron rods. What do you infer from this ?

This means of protection generally indicates that the rooms are being or have been used as a nursery. It is essential that there shall be no lack of ventilation and the windows must constantly be opened. To reduce the danger of falling out iron bars are used as a protection.

## *Building Bye-laws—Overcrowding*

19. A man desires to build a house in a certain neighbourhood. What steps must he take before building, actually commences?

He must submit the plans of the house to the local council to ensure that the bye-laws in regard to drainage, size of rooms, ventilation, material, etc., have been complied with. Not until the plans have been sanctioned can building legally be commenced.

20. What are the objections to overcrowding a house with furniture, hangings, ornaments, etc.?

(a) Unnecessary work is entailed. (b) Too much furniture encourages the accumulation of dirt. (c) More space is available for the occupants if overcrowding is avoided. (d) Fresh air can be introduced and distributed more easily if there is free access to windows and doors.

## XXI.—THE HUMAN BODY.

### 1. What is the difference between physiology and anatomy ?

Physiology is the science which deals with the functions of the various organs of the body. Anatomy treats of the structure, form, and position of the various parts of the body.

### 2. What is meant by the organs of the body ?

The organs of the body are those parts which perform special functions. Thus the organ of hearing is the ear, of smell the nose, and so on. The work carried out by any particular organ is called its function. Any person possessing an organ which is unable to carry out its work properly owing to disease, is said to be organically diseased.

### 3. What is a vital organ ?

Some of the organs of the body such as the heart, brain, lungs, etc., are so closely associated with the life of the body, that they are called "vital" organs (from the Latin word "vita," meaning life). If any of these organs be diseased or damaged the health is seriously affected. The other parts of the body suffer in consequence, and if the trouble be not removed death follows.

### 4. Why is the blood said to be "the life of the body" ?

Because all the nutriment taken into the body to make muscle, bone, fat, etc., must enter the blood before it is carried to all parts of the body to perform its work.

### 5. What are the main functions of the skeleton of the body ?

The main functions of the skeleton are: (a) To give the body shape. (b) To form a support for the body.



## *Vital Organs—Bones*

(c) To protect the organs of the body. (d) To enable us to move.

The various bones composing the skeleton are fitted to perform their special function. Where much work has to be performed the bones are protected by a thick layer of muscle, as in the case of the legs and arms.

✓ 6. How are the vital organs of the body specially protected ?

The brain is enclosed in a bony structure designed to afford that protection which so delicate and important an organ of the body requires. Similarly the heart and lungs are enclosed in a bony structure formed by the ribs and backbone.

✓ 7. Why are the bones of an infant easily bent ?

Bones are composed partly of animal matter and partly of mineral matter. In the case of infants animal matter preponderates. This consists practically of gristle and it is very easy to bend or twist the bones of a child if the greatest care be not taken. If a young child be allowed to walk at too early an age the bones of the leg may be permanently bent.

✓ 8. What is it that makes the bones of elderly people very brittle ?

The bones of elderly people are composed mainly of mineral matter which causes the bones to harden and become brittle. Old people should guard against falling because their bones easily break and only knit again with difficulty after being set.

9. How do the flat skull bones protect the brain ?

Flat bones are generally arranged in two layers with an absorbent layer of bony substance between them.

## ***Muscles—Joints—"Plantar Arch"—Ears***

A blow on the head is not so likely to injure the brain as it would be if there were no spongy layer between the bones. The shock caused by a blow is absorbed and diffused through this layer, instead of being transmitted through the bones and affecting the brain.

**10. What are muscles, and how do they perform their work ?**


The muscles are the lean or fleshy parts of the body, and every movement of the body is made by the contraction or relaxation of these muscles. Those which move under the influence of the will are called voluntary muscles, *e.g.*, the muscles of the arms and legs, whilst those which carry on their work independently of the will are termed involuntary muscles, *e.g.*, the muscles of the heart, stomach, lungs, etc.

**11. What provision is made to enable the bones to move freely at the joints ?**

All the joints of the body are protected by smooth pads of cartilage, at the ends of the bones. These pads, and also the ligaments which hold the bones in position, are kept smooth and moist by an oily secretion known as "joint oil" or synovia.

**12. What is meant by the "Plantar arch" ?**

The arch of the foot is known as the "Plantar arch." It acts like an elastic spring and allows us to walk and run without shaking or unduly jarring the body.

 **13. Why is it dangerous to box children on the ears ?**

Because in young children the bones of the skull do not meet. A blow on the head or ears may result in serious injury to the brain which in places is totally unprotected by a bony covering. The delicate bones of the ear are liable to injury from such a blow.

## *Hands—Spinal Cord—Teeth—Skin*

**14. Why is it easy to use the hands for all kinds of work both light and heavy ?**

Because the bones of the hand are united by very strong but very flexible ligaments which give strength and elasticity to the hand. The bones of the hand number twenty-seven, and by this arrangement the effect of a blow is diffused throughout the bones, and no harm is done. Otherwise, the concussion caused by using a heavy tool might shatter the hand.

**15. What is the spinal cord ?**

The spinal cord is nerve matter which passes from the brain down the centre of the spine. It sends out nerves in all directions.

✓ **16. What are (a) wisdom teeth ? (b) incisors ? (c) milk teeth ?**

(a) The wisdom teeth are the last of the permanent teeth to appear, and consist of four molars. They are so called because they are not usually cut until the twenty-first year. (b) The incisors are the eight sharp chisel-like teeth in front of the upper and lower jaws. They are used in biting an apple or hard material, and are very strongly developed in animals such as rabbits, squirrels, beavers, etc. (c) The milk teeth are those which precede the permanent teeth. They fall out as the latter appear.

✓ **17. Of what use is the skin ?**

The skin serves as a protection for the body, and also as one of the most important organs of excretion—that is it collects waste substances from the blood and rids the body of the same. This waste material appears on the skin as sweat.

## *Lungs—Gland—Windpipe*

### **18. What is the main function of the lungs ?**

• Through the thin cell walls of the lungs oxygen passes to the blood and carbon dioxide and moisture pass out of the blood and are expired.

### **19. What is a gland ?**

A gland is an organ of the body which has the power of secreting or taking up certain substances from the blood. The liver, which secretes bile, is the largest gland in the body.

### **20. How is the windpipe protected during the act of swallowing food ?**

A hard gristly flap called the epiglottis is situated at the back of the root of the tongue. When food is being swallowed the epiglottis is forced down by muscles and closes the entrance to the windpipe. Breathing of course stops for the moment, but is resumed when the flap rises after the food has passed over it.

## XXII.—THE LAW AND LAW COURTS.

1. What is meant by a person "taking the law into his own hands"?

Assuming without trial that your own case would win, and proceeding to administer punishment.

2. Mention any early forms of trial in use before our present-day system was developed.

In Anglo-Saxon times we read of trial by "compurgation" and trial by "ordeal." In the former case a number of persons called "compurgators," bore evidence to the irreproachable character of the accused and tried to establish his innocence. In trial by "ordeal" the accused person was required to seize a piece of red hot iron and carry it three paces, or to draw a piece of iron or stone from a vessel of boiling water. If after seven days the hand or arm had completely recovered, the accused was considered innocent of the crime with which he was charged. In Norman times, trial by "battle" was in evidence. The person who triumphed was considered innocent. In the reign of Henry II. these unsatisfactory systems were superseded by trial by jury.

3. What is meant by "maiden assizes"?

If when the judge comes to the assizes there are no prisoners, it is called a "maiden assize." The judge is presented with a pair of white gloves.

4. Of what use is a county court?

County courts were established in order that minor charges against persons might be disposed of expeditiously. To recover small debts creditors frequently "put debtors in the county court." It is a common

## *Magistrates—"True Bill"—Bail*

occurrence to read of county court judges disposing of dozens of such cases in the same day.

**5. In whose hands does the appointment of magistrates rest ?**

Recommendations for persons' names to be put on the roll of the "justices of the peace" for certain districts are made by Lords Lieutenant of counties. These names are submitted to the Lord Chancellor, who finally makes the appointments. The greatest care is exercised that only names of suitable persons shall be included in the list. Some people, for example, the chairman of a district council—become justices of the peace by virtue of their office.

**6. What is meant by "returning a true bill" ?**

The grand jury returns a "true bill" against a prisoner when, after considering the evidence, they are of opinion that the charge against the prisoner is well founded. If they consider such is not the case they enter the opinion "no true bill," and the prisoner is immediately discharged.

**7. "Prisoner was admitted to bail," is an expression frequently met with in police court news. What does it mean ?**

When the charge brought against a person is not sufficiently grave to warrant his detention, he is allowed to go to his home providing his friends promise to pay a fixed sum of money should he fail to appear for trial at the time fixed. Occasionally the prisoner himself "goes bail" for himself.

**8. What is a stipendiary magistrate ?**

Magistrates as a rule are unpaid, but in cities and large towns where many cases have to be dealt with it

## *Warrants & Summons—Taking Oath*

is often found necessary to call into service a paid member who is called a stipendiary magistrate. He relieves the ordinary magistrates of work which would make too great a demand upon their time.

### **9. What difference is there between a warrant and a summons ?**

When a person is under suspicion a "warrant" authorises a police officer to arrest him. A "summons" is merely an order which requires a person to present himself at the court at a certain time on a date fixed. Should he fail to respond a "warrant" may be issued for his arrest.

### **10. When a witness in a court of law is about to give evidence what promise is made ?**

Every person on entering the witness box to give evidence is required to take an oath or else solemnly to promise that he will "speak the truth, the whole truth, and nothing but the truth," finishing up with an invocation to God to help him to do so. Should any one be found guilty of swearing falsely, a charge of perjury may be brought against him, an offence punishable by heavy penalties.

### **11. What law prevents a person being unduly kept in prison without being given a trial ?**

Should a person be arrested for disturbing the peace or any other offence he may be locked up for the night, but by virtue of the "Habeas Corpus Act" (1679) he must be brought before the magistrate on the following morning. This Act was passed to prevent the recurrence of the practice of keeping a person in prison for an unreasonable time before bringing him to trial. This procedure had caused much injustice and unnecessary punishment.

## *Assizes—Grand Jury—Court of Appeal*

**12. What is meant by the expression "Prisoner was committed to the assizes"?**

If a person be brought before a magistrate and the charge is found to be of such a serious nature that the magistrate is unable to deal with it, it is customary to send the prisoner to be tried at the next assizes by one of the judges on circuit assisted by a jury of twelve men.

**13. What are the duties of a grand jury?**

The "grand jury" meets before the assizes or quarter sessions, and under the direction of the judge goes into the evidence against those who are awaiting trial. This evidence is carefully considered, and the accused is either sent for trial or liberated.

**14. A person is dissatisfied with a decision of the court. What steps can be taken to secure a further trial?**

The judge may allow an appeal. If so, the case is retried by the Court of Appeal. A further appeal may be allowed to the House of Lords. This is the highest court. It consists of the law lords who are the most distinguished of the judges.

**15. What is meant by (a) plaintiff? (b) defendant?**

(a) A plaintiff is a person who is seeking to establish his rights or to secure damages against some one. (b) A defendant is one who is resisting a charge brought against him in a civil action.

**16. A person is tried for an offence and is acquitted. What does the law say in regard to this?**

If a verdict of "not guilty" is returned a person is in no danger of being tried again for that offence.



## *Public Prosecutor—Barrister—Solicitor*

### **17. Who is the Public Prosecutor ?**

The Public Prosecutor is a person officially appointed to conduct any prosecution or to conduct any enquiry relative to it in the public interest.

### **18. In what circumstances were the following words used :—**

**“ Happy is the king who possesses a judge so resolute in the discharge of his duty, and a son so willing to yield to the authority of the law ” ?**

These words were used by Henry IV. when his wayward son, “ Prince Hal,” had been committed to gaol by Judge Gascoigne for insulting conduct in the court. After giving a decision against one of the Prince’s friends Prince Hal entered the court and threatened the judge, ordering him to release the prisoner.

### **19. What is the difference between a barrister and a solicitor ?**

“ Barristers ” appear and plead in the higher courts. They always appear in black gowns and wigs.

“ Solicitors ” prepare all legal documents and evidence in connexion with their clients’ cases, but they are not allowed to plead in the higher courts. In these cases they employ barristers—that is, the evidence is given as a brief to a barrister.

### **20. What is meant by “ taking silk ” ?**

Barristers of repute are raised by the sovereign to be K.C. or Q.C. (King’s Counsel or Queen’s Counsel). The office is an honorary one, but it carries with it the right to wear a silk robe or gown. Hence to become a K.C. or Q.C. is said to be “ taking silk.”

## XXIII.—LITERATURE.

**1. Who was the "Father of English poetry" and why was he so called?**

Geoffrey Chaucer is called the "Father of English poetry" because he was the first great poet to write in the English tongue. Previous to his time (1340—1400) most of the poets wrote verse in the Latin tongue. Chaucer's masterpiece was "The Canterbury Tales," a series of stories supposed to be told by pilgrims on their way to visit the shrine of Thomas à Becket in Canterbury Cathedral. They give us an excellent idea of the times and customs of the fourteenth century.

**2. How are Shakespeare's plays divided?**

Shakespeare wrote three kinds of plays—tragedies, comedies, and historical plays. The tragedies show us the dark side of human nature, the comedies the lighter side, whilst the historical plays cover a large part of English history.

Shakespeare was born April 23rd, 1564, and died April 23rd, 1616.

**3. What is an ode?**

The ode is a form of lyric poetry, that is poetry which is capable of being set to music as the name implies. It may be described as a song of praise addressed to a great person, a nation, a season, or to anything living or dead, which can reasonably be addressed in this way. Odes are not now set to music. A typical example is, "The ode on the Death of Wellington," by Tennyson.

**4. What literary men are referred to in the following :**

(a) "The Bard of Avon"? (b) "The Sage of Chelsea"?  
(c) "The Lady of the College"?

(a) William Shakespeare is described as "the Bard of Avon." At Stratford-on-Avon he was born, brought

## *Quotations—Women in Literature*

up, and buried. (b) Thomas Carlyle is described as “the Sage of Chelsea,” because he was a philosopher—the “philosopher of work”—and lived in Chelsea. (c) John Milton, because of his long hair parted down the centre, his delicate complexion, and gentle bearing, was called by his college friends “The Lady of the College.”

5. From what poems are the following quotations taken :

- (a) “I remember, I remember,  
The fir trees dark and high.”
- (b) “They say it was a shocking sight,  
After the field was won.”
- (c) “I fling to the air my arms,  
For I know it is all for me.”

(a) These words are found in Tom Hood’s well-known poem, “I remember,” in which he depicts the scenes of his childhood days. (b) Robert Southey in his poem, “The Battle of Blenheim” uses these words. He was Poet Laureate of England. (c) These words are from Longfellow’s poem “The Windmill.”

6. In what books or writings do the following women appear : “Portia” ? “Topsy” ? “Dolly Varden” ? “Rebecca Sharp” ?

(a) “Portia” is the clever heroine of Shakespeare’s “Merchant of Venice.” (b) “Topsy” is the famous irreclaimable young slave-girl in Mrs. Stowe’s “Uncle Tom’s Cabin.” (c) “Dolly Varden” is the heroine of Dickens’ “Barnaby Rudge.” (d) “Rebecca Sharp,” familiarly called Becky Sharp, is the resourceful scheming heroine of Thackeray’s “Vanity Fair.”

7. What writer of the Victorian age exposed many of the unnecessary hardships of the lower classes ?

Charles Dickens, who was born February 7th, 1812, and died June 9th, 1870. In many of his writings he

## *Authors—Rhyme and Rhythm, etc.*

attacks the abuses of his time. In "Oliver Twist," for example, he exposes the evils connected with workhouses and thieves' dens.

8. Who were the authors of the following verses :  
(a) "The Better Land" ? (b) "The Brook" ? (c) "The Land of Nod" ? (d) "The Spanish Armada" ? (e) "Jesu, Lover of my Soul" ? (f) "The Village Blacksmith" ? (g) "The Marseillaise" ?

(a) Mrs. Felicia Hemans. (b) Lord Tennyson.  
(c) Robert Louis Stevenson. (d) Lord Macaulay.  
(e) Charles Wesley. (f) Henry Wadsworth Longfellow.  
(g) Rouget de Lisle.

9. What is meant by (a) rhyme ? (b) rhythm ?

Rhyme is the use at the ends of lines of verse of words with the same sounds. Rhythm is the regular recurrence of accent in verse.

10. Who wrote "The Pilgrim's Progress" ? What form of writing is it ?

"The Pilgrim's Progress" was written by John Bunyan. It is one of the most famous allegories in the English language. An allegory is a fictitious story which teaches some truth by means of symbolic language.

11. What is meant by a "Figure of Speech" ?

A figure of speech is a form of expression where something else is meant than is actually said, e.g., "a torrent of abuse"; "a land flowing with milk and honey"; "footprints on the sands of time."

12. What books give a good account of the following :

(a) The conditions of England during the Norman invasion ? (b) The adventures of Elizabethan sailors ? (c) The times and customs of the Restoration ? (d) The French Revolution ? (e) The introduction of machinery

## *Poet Laureate—Quotations, etc.*

into the industrial life of England? (f) The experiences of a schoolboy during early Victorian times?

- (a) Charles Kingsley's "Hereward the Wake."  
(b) Charles Kingsley's, "Westward Ho." (c) Pepys' "Diary," and Evelyn's "Diary." (d) Charles Dickens' "Tale of Two Cities." (e) Mrs. Craik's "John Halifax, Gentleman," and Mrs. Gaskell's "Mary Barton."  
(f) Charles Dickens' "Nicholas Nickleby."

### 13. What is meant by the poet laureate?

The poet laureate is the national poet. He is appointed by the Prime Minister of the day, and the appointment is for life.

14. Where do the following lines occur: (a) "No useless coffin enclosed his breast?" (b) "God's in His heaven—All's right with the world"? (c) "Peace hath her victories no less renowned than war." (d) "Magic casements, opening on the foam of perilous seas, in fairie lands forlorn"?

- (a) In Charles Wolfe's "Burial of Sir John Moore."  
(b) In Robert Browning's "Pippa passes." (c) In John Milton's sonnet on Cromwell. (d) In John Keats' "Ode on a Nightingale."

15. What characters in English literature (a) "Asked for more." (b) "Said she wasn't born, but grow'd." (c) "Always waited for something to turn up." (d) Asked for his pound of flesh?

- (a) Oliver Twist, the hero of the book by Dickens bearing this name. (b) "Topsy," the incorrigible slave-girl in "Uncle Tom's Cabin." (c) "Mr. Micawber," in Dickens' "David Copperfield." (d) Shylock, the Jew in Shakespeare's "Merchant of Venice."

## *Alliteration—Elegy—Stanza—Couplet*

16. What is meant by "alliteration"?

By alliteration is meant using in a sentence several words beginning with the same letter, *e.g.* :—

"Apt alliteration's artful aid."

"You big, black, bounding beggar  
You broke the British square" (Kipling).

17. We often hear of a poem called Gray's "Elegy." What is an "elegy"?

An elegy is a form of funeral poem. It is generally a poem mourning the death of a great man, but it may express the sadness of life, as in Gray's "Elegy written in a country churchyard." Milton's "Lycidas" and Tennyson's "In Memoriam" are famous examples of elegies. Goldsmith's "Elegy on the death of a mad Dog" is an amusing example.

18. What do we mean by (a) a stanza? (b) a couplet?

(a) A stanza is a number of lines of verse rhyming as a unit. (b) A couplet consists of two rhyming lines.

19. Who was : (a) "The ploughboy who became a poet"? (b) The great English poet and writer who wrote a famous history of England? (c) "The blind poet"? (d) "The greatest Scotch novelist and poet"? (e) "The sweet singer of Israel"?

(a) Robert Burns. (b) Lord Macaulay. (c) John Milton. (d) Sir Walter Scott. (e) "The sweet singer of Israel" was David.

20. What do you know of : (a) "Aladdin"? (b) "Alice"? (c) "Antonio"? (d) "The Artful Dodger"?

(a) Aladdin, who possessed a wonderful ring and lamp, is the hero of one of the "Arabian Nights" tales. (b) "Alice" is the child heroine of Lewis Carroll's "Alice's Adventures in Wonderland." (c) Antonio is the Merchant of Venice in Shakespeare's play of that name. (d) "The Artful Dodger" is the clever young thief in Dickens' "Oliver Twist."

## XXIV.—LOCAL GOVERNMENT.

**1. What record gives an interesting account of the earliest attempts made in this country at local government ?**

This was the Anglo-Saxon Chronicle which was supposed to have been mainly written by Alfred the Great. Many references are found in it to the way in which the country was governed by local "moots" or councils. Upon these our present system of local government has been founded.

**2. Explain what is meant by the "Soke of Peterborough," and "Well Motts Meadow."**

(a) The word "soke" comes from an old Anglo-Saxon word "soc," meaning "to hold a council or court." The term soon came to mean the district over which the council or court had jurisdiction, hence the district called by that name.

(b) Well Motts Meadow—This was the ancient meeting place of a parish. The parish meeting place was usually near a well or spring. Motts is probably derived from "gemot," a meeting.

**3. What are the advantages connected with local government ?**

The people who live in a district are best fitted to administer the laws in that area. They are in touch with local requirements. The needs of one county or town or parish may differ widely from those of another, and those on the spot are most likely to know what are the most pressing requirements of the locality.

## *County Council—Alderman*

### **4. What is a county council? What are its chief duties?**

(a) A county council is a body elected to control the affairs of a county. Its main work is to see that the laws passed by Parliament are carried out, in its own district. It also has the right to make laws and regulations of its own. These must be sanctioned by Parliament.

(b)—(a) It has to keep the main roads in repair. (b) It has to control bridges, asylums, industrial schools, and reformatories. (c) It has to divide the county into polling districts, to alter boundaries where necessary, and to control the work of education and of the police.

### **5. How are the various councils elected? What are the duties of district and parish councils?**

The various councils are elected by ballot by the people of the district over which the council has power. The district council exercises control over water supply, drainage system, sanitation, and various buildings such as lodging houses, workshops, bakeries, dairies. It is empowered to inspect food offered for sale in the district which it controls. The council has power to purchase land for the purpose of recreation grounds, village greens, public offices, etc., and appoint all officials necessary to carry out the administrative part of the work. The parish council looks after the footpaths and roads in the parish, except main county roads.

### **6. What is an alderman?**

An alderman is a member of a council elected by the councillors either from their own number or from outside the council altogether. He enjoys a longer term of service as a rule than a councillor. The system of appointing aldermen permits men of proved ability to help in local affairs even though they may not have the time or inclination to fight an election.



## *Roads—Administration Areas—Ballot*

### **7. What are county roads? Who controls them?**

These are main high roads running from one large town to another. They are kept in repair by the county council. Sometimes the latter arranges to pay a district council to keep them in order.

### **8. How are the expenses in connection with the work of the various councils, met?**

All expenses incurred by local councils are paid out of the rates. A rate is levied on the annual value of houses and land in the district. National expenses are defrayed from the taxes levied throughout the country.

### **9. What is an "administrative county"?**

An administrative county is that part of a county which is controlled by a county council as a separate administration. For example, Yorkshire is so extensive that it has been found necessary to divide it into three separate administrative counties, viz., North Riding, West Riding, East Riding. A borough situated in a county is not part of the administrative county, e.g., Birkenhead is situated in Cheshire but it is not under the control of the Cheshire County Council. It is administered by its own council.

### **10. What steps are taken to prevent children going into a workhouse?**

Many boards of guardians have availed themselves of the power to place such children under the charge of private people who are paid a certain sum for looking after them.

### **11. Explain what is meant by "voting by ballot."**

Voting by ballot means voting secretly. The paper used is called a "ballot" paper. It is placed in a "ballot" box in connexion with which the greatest secrecy is observed.

## ***Boroughs—Constituency—Franchise***

12. The population of a certain village increases so greatly that the inhabitants think they have a strong claim to be regarded as a borough. What steps must they take to test their claim ?

They must first acquaint their county council of such an intention, and advertise their petition in the *London Gazette*. Then they must send to the King a largely-signed petition for a charter of incorporation as a borough. If there is no opposition an Order in Council is then made by the Privy Council.

13. What is (a) a constituency ? (b) a ward ?

(a) A constituency is a district represented by a member of Parliament. Some constituencies return more than one member. (b) A ward is a part of a town or city which sends one or more representatives to the city or town council.

14. In a certain district it is found that the children are not sufficiently fed. How can this be remedied ?

Local authorities are now allowed to provide food for hungry poor children, at the expense of the rates. They can recover the cost through the police court in cases where parents can afford to feed their children but neglect to do so.

15. What is meant by "exercising the franchise" ?

Many people who are qualified to vote at an election fail to do so. Those who avail themselves of the privilege are said to be "exercising the franchise."

16. A man saw the following expression on an old map, "The Newark Hundred." What does it mean ?

This refers to one of the old divisions of local government. A number of villages—varying from 100 to 120—

## *Revision Courts—Watch Committee*

were grouped into one corporate body called a "hundred." The meeting was called the "hundred moot." It controlled the affairs of the district which it represented.

### **17. What is meant by "a revision court" ?**

Revision courts are held annually to revise or correct the lists of voters. A barrister is appointed to conduct the work and to hear and settle claims.

### **18. Why is November 9th an important day to persons who take part in local government work ?**

November 9th is popularly termed "Lord Mayor's Day." Upon that day the new mayors and lord mayors take up office as presidents of the councils by which they have been elected.

### **19. What is a "watch committee" ?**

A "watch committee" is specially deputed by the local authority to control the work of the police force in its area. It derives its name from the predecessors of the present-day policemen, who were termed "watchmen." They walked the streets with staff and lantern calling out the hours as they passed.

### **20. A document on a church door is signed by the overseers of the parish. Who are they ?**

The work of the overseers of a parish is to see that all persons entitled to vote have their names duly placed on the voters' lists. They also are called upon to levy and collect the poor rate. Another duty is to prepare lists of persons liable to serve on juries.

## XXV.—MANNERS, CUSTOMS, &c.

**1. Why is the first week-day after Christmas Day called Boxing Day ?**

It is so called, because Christmas boxes or presents used to be given to employees, messengers, postmen, etc., on that day. The custom is dying out of use.

**2. How is it that Protestants and Roman Catholics keep the first day of the week as the Sabbath ?**

The Law of Moses fixed the seventh day of the week as the Sabbath, but as Christ rose from the dead on the first day of the week, this day has since then been observed as the sabbath by Protestants and Roman Catholics. The Jews still observe the seventh day.

**3. What is meant by " Maundy Thursday " ?**

"Maundy Thursday" is the name given to the Thursday preceding Good Friday. The day commemorates the washing of the disciples' feet by Jesus Christ, and the practice is still followed by the Pope and some Roman Catholic monarchs. On this day Maundy money, consisting of small silver coins given by the Sovereign, is distributed at Westminster Abbey. The recipients are selected from London Parishes.

**4. Name an English poet, and a Scotch poet, who extolled character rather than rank and riches.**

(a) Lord Tennyson, who wrote :—

"Howe'er it be, it seems to me,  
'Tis only noble to be good.  
Kind hearts are more than coronets,  
And simple faith than Norman blood."

(b) Robert Burns, who wrote :—

"The rank is but the guinea stamp,  
The man's the gowd, for a' that."

## *Coming of Age—Newspapers*

### **5. What is meant by "coming of age" ?**

This refers to the time when a person reaches manhood's estate. In England the age is fixed at 21 years, and up to this age a person is regarded as a minor, and is prevented from exercising many of the privileges and responsibilities of adults.

### **6. When the Sovereign is travelling by rail what custom is always observed ?**

When the Sovereign travels by rail it is the custom to send a pilot engine in front of the royal train.

### **7. When a man on active service has received an important decoration for bravery at whose hand does he receive it ?**

These decorations are generally presented by the sovereign in person. A special function called an investiture is held, and all who have been awarded certain decorations are called upon to attend. Should the recipient have been killed as a result of his action the decoration is presented to his next of kin.

### **8. Why are several editions of newspapers printed ?**

Early editions of morning newspapers are printed chiefly for despatch to distant places so that they may be available early in the morning. The later editions usually circulate near the newspaper offices. Various editions of the evening papers are published to meet the demand for early information. Business men are anxious to know of any fluctuations in the money market, fruit and provision merchants of the arrivals of ships, politicians of the doings in Parliament. A large number of people want the latest sporting news, and there is the general desire for news of important events.

## *Sovereign's Birthday—Famous Customs*

**9. How is our Sovereign's birthday always marked ?**

The Sovereign's birthday is the occasion of the issue of a "Birthday Honours' List," which contains the names of men and women who have been granted peerages and other honours.

**10. When a member enters Parliament for the first time after his election, what course is followed ?**

He is called upon to take the oath, and is introduced to the Speaker by two sitting members, usually friends.

**11. What custom is followed on the anniversary of the death of a great man ?**

It is the custom to cover the grave of the man with flowers or evergreens. If the celebrity had a favourite flower, it is given the place of honour if it is procurable at the time. For example, the grave of Lord Beaconsfield is decorated with primroses every year, on the anniversary of his death, and his admirers wear one in their button holes, and call the day "Primrose Day."

Monuments erected in memory of great men are also decorated with flowers, laurel wreaths, etc.

**12. Why are queues formed by people going to a theatre, boarding a tramcar, etc ?**

(a) The custom prevents congestion, and thereby lessens the risk of accidents. (b) It gives fair treatment to all—each has to take his turn. (c) It enables cars to load and unload in an orderly manner. In connexion with tramcars, it is only necessary at very busy points in large towns.

**13. How is it that cinematograph films are manipulated in a room made expressly for the purpose ?**

The films are of such an inflammable nature that it is necessary to manipulate them in a fire-proof room. These

## *Popular Terms and Customs*

rooms are now always provided in picture-houses. The danger from fire in the part of the house occupied by the audience is thus reduced to a minimum.

**14. What is meant by "age before honour"?**

Courtesy and respect are due to old people.

**15. What is meant by a "silver" wedding?**

A "silver" wedding is celebrated on the twenty-fifth anniversary of the wedding day. In honour of the event relations and friends often make gifts of silver articles. The fiftieth anniversary of the wedding day is termed the "golden" wedding.

**16. A cry of "fire" is raised in a crowded building. What should the audience do under the circumstances?**

They should remain quiet and follow instructions. In buildings used for public gatherings plenty of exits are provided, so that the building can be emptied rapidly if order and discipline are maintained. Deaths are generally caused at such times through passages becoming blocked and people being squeezed to death, or trampled upon.

**17. What is meant by "Independence Day" in America?**

This day is celebrated in the United States, in commemoration of the Declaration of Independence. The whole country joins in the celebrations—the day, July 4th, being a gala day.

**18. What custom is observed before Parliament re-opens after a long holiday?**

The cellars underneath the House of Lords are searched, in order to ensure that no attempt has been

## *The "May Queen"—The Leek*

made to blow up the House by explosives. This custom has been followed since the discovery of the famous Gunpowder Plot, November 5th, 1605.

### **19. What do you know of the "May Queen" ?**

May Day celebrations have been popular, especially in rural districts, for centuries. The crowning of the May Queen has been one of the most interesting events associated with such celebrations. Frequently a procession is formed and the ceremony takes place on the village green. Dancing round the maypole is indulged in, and games are played. The practice is immortalized in Tennyson's poem "The May Queen."

### **20. Why was the leek selected as the national emblem of Wales ?**

In olden times the Welsh were engaged against a stubborn enemy, and they appealed to St. David for advice and help. He ascertained that they had lost a number of men, killed by their own hands, as in the excitement of the battle they had been unable to distinguish friend from foe. St. David advised them to wear some distinguishing mark to prevent the recurrence of such a catastrophe. Seeing some leeks in a garden near by, he plucked some and handed them to his countrymen. In the ensuing battle all their strength was used against the enemy, who was defeated and routed. Ever since the leek has been used as the national emblem of Wales.



## XXVI.—MARKET, TRADE.

### 1. Where are market towns usually situated, and why ?

Market towns are usually situated where the main roads of a district converge. In olden days traffic was carried on along roads. The towns and villages usually lay in close proximity to the chief roads and the crossing places would be easily accessible to many people. Modern market towns are usually within easy reach of railways.

### 2. Why are tradesmen usually busy on market days ?

The tradesmen of a town naturally benefit when there is an influx of visitors. Many country people make their weekly purchases when they go to town on market day. Tradesmen often make a special display of goods on market days.

### 3. Why is Saturday specially convenient as a market day ?

(a) Because people are anxious to lay in a supply of fresh food for the week-end. (b) Wages are generally paid on Friday evening or on Saturday at mid-day. (c) Saturday afternoon in many occupations is the weekly half-holiday, when the workers of the town and district often pay a visit to the neighbouring market. (d) Business people can make up their accounts for the week after the market is closed.

### 4. Can any person take his goods and expose them for sale in a market without restriction ?

Local councils and urban authorities control the markets situated within their areas. Any person wishing to rent a position in a market must consult such an authority, and satisfy them that he is in a position

## *Market—Food Inspectors—Fairs*

to use the market space for trade purposes. Tolls are payable and rigid rules and regulations are often enforced.

5. What system is generally adopted in arranging the stalls in a market, and why ?

As far as possible markets are arranged so that stalls where the same kind of goods are sold shall be together. For example, fishmongers are relegated to one part, nurserymen to another. In this way much time is saved, purchasers making their way to that part of the market which contains the class of goods they want.

6. What is a "corner in the market" ?

When one man or a group of men buy up the whole available supply of any commodity on the market, they are said to corner the market. They can often manipulate the sale in such a way that they are able to secure a high price for that commodity.

7. How are the interests of purchasers looked after in connexion with articles sold for consumption ?

In connexion with all markets the strictest supervision is exercised in regard to the sale, protection, and quality of foodstuffs. Properly qualified inspectors pay frequent visits and condemn any food which they decide is unfit for human consumption.

8. What are fairs, and how do business people in towns generally view them ?

A fair is a market on a large scale, and is usually held once or twice a year. Many of these fairs have now degenerated into mere pleasure turns, and business people, as a rule, find that their takings go down during "fair" time. The money goes to the proprietors of shows, etc., instead of into the ordinary business channels.

## *Market Trains—Trade Marks*

### 9. What are "market trains" ?

In ordinary times special trains are run by railway companies on market days at reduced fares to enable people in country districts to visit the market.

### 10. What facilities are provided to enable people living away from railways to visit the town on market day ?

In remote country districts carriers' carts, similar to those mentioned by Dickens, run to town on market days. Nearly all villages and hamlets are linked up in this way to the nearest market town. Passengers and goods are transported by this means.

### 11. What is a trade mark ?

A trade mark is a mark imposed upon goods, or upon the wrapper containing the goods, to show that the latter are those of a particular trader. Trade marks are protected by law and it is an offence for a trader to use the trade mark of any other firm.

### 12. Why is Britain called "the workshop of the world" ?

This description is applied to Great Britain because within the island goods required by practically all the nations in the world are manufactured. This title was earned during the nineteenth century, following upon the discoveries and work of James Watt, Hargreaves, Arkwright, Brindley, and others.

### 13. What is meant by a "glut in the market" ?

This expression is used to describe the state of the market when the supply of the commodity far exceeds the demand.

## *Bankrupts—Carriage Forward*

**14. A tradesman finds himself unable to pay his debts. What steps are taken if this be the case ?**

In this case a person usually "files his petition," and announces his "bankruptcy." A meeting of creditors is held, and the affairs of the bankrupt are placed in the hands of an "official receiver" appointed by the Board of Trade, who administers the debtor's property. If the latter does not secure his discharge, then it is against the law for him to contract a debt of £20, without acquainting the creditor with the fact that he is an undischarged bankrupt. He cannot undertake any public office unless he has secured his certificate of discharge.

**15. A man makes a purchase, the goods to be sent "carriage forward." What does this mean ?**

This means that the person to whom the goods are sent must pay the cost of carriage when they are delivered.

**16. The morning paper says frequently : "The market opened dull." What does this mean ?**

This term indicates that the demand for the commodity referred to was not very great and that consequently little business was done.

**17. What is a "middleman" ?**

A middleman is a wholesale dealer who takes produce from the manufacturer and distributes it to retailers. If there is an unnecessary number of middlemen, one selling to another and each making a profit, the price paid for goods by the consumer is unduly raised.

**18. Why are prices of commodities in different markets practically the same ?**

Ready and rapid means of communication have developed and stabilized market transactions. If the

## *Telegraphic Address—Market Prices*

price is temporarily raised in any market, goods flow in and the price falls. If the price is low goods are sent elsewhere.

### **19. What is a telegraphic address ?**

All large business houses in populous cities and towns have adopted short "telegraphic addresses" for use by their clients in order to save them expense. These addresses are registered by the Post Office for a small annual charge.

### **20. How are market prices regulated ?**

Market prices are regulated by the law of supply and demand. When the demand for any commodity exceeds the supply, prices rise. When the supply is greater than the demand, prices fall.

## XXVII.—MEANS OF COMMUNICATION.

**1. A person is not "on the telephone." What means are provided, to enable him to speak over the telephone ?**

In all towns and most villages public telephones are provided which any one may use for a small fee. Panels of white bearing a blue bell, or the royal arms in red, indicate that people may use the telephone. Sometimes special kiosks are provided ; in other cases the telephone is fixed inside buildings—shops, offices, etc.

**2. How would you make use of a public telephone ?**

In all places where a public telephone is to be found, a list of subscribers is placed with their respective numbers appended to their names. The number required is taken from this book. After following the directions found inside every public telephone call office, the number is given to the operator at the exchange, who will advise whether it is possible to get into touch with the person required. If so, directions will be given as to the amount which is to be paid. This must be dropped, a penny at a time, into the box provided. The line is then clear for a conversation.

**3. How were goods carried in the days before railways were introduced ?**

For centuries rivers and roads were the only means of communication in this country and goods were carried by boat or horse-drawn vehicle. Pack-horses carrying goods on their backs, often followed the tracks over moor and hill.

## *Stage-coach—Telephone—Trade Winds*

### **4. Why was the stage-coach called by that name ?**

The stage-coach received this name because the journey was done in stages, the coach being stopped at certain fixed points on the road to change horses. These stopping places often grew into important villages, as they were usually situated at cross roads where people from various parts of the district could join the coach.

### **5. Why are telephone wires to houses generally carried underground from the exchange ?**

The wires are laid underground for convenience. The leaden pipes enclosing them would be very unsightly if placed above ground. They would also be more liable to injury. For long distances it is found that overhead wires are necessary, as there is less leakage of current.

### **6. What is meant by the term "trade winds" ?**

The trade winds are so-called because blowing with great regularity throughout the year (N.E. in the northern hemisphere and S.E. in the southern hemisphere), they gave great assistance to trading vessels in the old days when ships depended on the wind to propel them.

### **7. A river is often rendered unnavigable by the deposit of sand at its mouth. How is the river cleared ?**

The deepest part of many of our tidal rivers is only kept navigable by constant dredging ; otherwise mud and sand would settle down, and choke the river. In the Suez Canal, owing to sandstorms sweeping over it, large dredgers have to be kept constantly at work.

### **8. What is a submarine cable ?**

These are cables of stout copper wire enclosed in a covering of gutta-percha for purposes of insulation.

## ***"Wind-jammers"—Tramcars—Canals***

Outside this is a coating of hemp which is sheathed by a layer of steel or iron wires. Finally there comes a coating of tarred canvas to prevent rusting. Near the coast the cable is specially strengthened. Cables are used for sending telegraphic messages.

### **9. What are "wind-jammers" ?**

• This name was given to the old type of sailing vessel. It has been largely superseded by the modern steamship.

### **10. Why does an electric tramcar stop when the trolley leaves the overhead wire ?**

The current of electricity which is used for driving the cars, is led down the trolley to the controllers which are placed on the platforms at each end of the tramcar. If the trolley pole leaves the wire the circuit is broken and the car stops.

### **11. Why is it cheaper to travel by water than by land ?**

There is no permanent way to be paid for at sea. On land this is a very heavy expense. The consumption of coal at sea is much less in proportion to the amount of goods carried. At sea goods can be carried very great distances without trans-shipment.

### **12. What is done when making canals to get over the difficulty of sloping land ?**

Locks enable barges and ships to pass from one level to another in a canal. A lock is a portion of the canal with gates at either end. When going up, the barge passes into the lock. The lower gates are then closed and the upper ones slowly opened. When the lock fills



## ***"All-red" Route—Ocean Highways***

up, the barge passes out at the other end. In some cases inclined planes are used. Boats are placed upon cradles or carriages with wheels. These run on rails and are hauled up by means of cables. In other cases boats are floated in troughs which are worked by means of lifts, one going up as the other goes down.

### **13. What is the "All-red route" ?**

The "all-red route" is the route from England across Canada to Australia, etc. It is so called because it passes everywhere through British territory which is usually painted red on maps.

### **14. Why was the making of the Panama Canal watched with great interest by English people ?**

(a) Because it would shorten the voyage from England to the States of America lying on the Pacific, and save the long and perilous voyage round Cape Horn. (b) New Zealand would be brought 1,500 miles nearer. (c) The distance between England and Japan and China would be considerably reduced and communication made easier.

### **15. What is meant by the "highways of the ocean" ?**

Just as on land there are roads upon which traffic passes incessantly, so there are routes on the ocean which have become highways of commerce. These routes are used by the ships of all great commercial nations.

### **16. What are "ocean-greyhounds" ?**

This name is given to ships specially built and engined to travel at great speed, say, eighteen knots per hour or more. They are passenger ships.

## *Plimsoll Mark—Electric Cables*

**17. What must the captain of a ship do on arriving in port ?**

The captain must hand in his report at the customs-house, and give full particulars of the amount and nature of his cargo. Until this has been done, the cargo cannot legally be unloaded.

**18. What is the "Plimsoll Mark" on the side of a ship ?**

The "Plimsoll Mark," called after the man who secured its introduction, is a painted circular disc twelve inches across with a horizontal line running through the centre. It is placed amidships. It is also called the "load-line" and is used to indicate the depth to which the vessel may sink when loaded. If this line when the ship is loaded, be below the surface of the water, the owners are liable to severe punishment.

**19. How is electricity supplied to tramcars ?**

The cable which conveys the electricity from the generating station is laid in earthenware pipes under the ground by the side of the track. This cable is connected to wires which run up the insides of some of the poles. These wires convey the current to the various sections of the trolley wire.

**20. When did England become the carrier for the world ?**

Previous to the time of the Commonwealth the Dutch had been supreme as the carriers of the world. Cromwell secured the ascendancy for England by means of the Navigation Acts which restricted the use of British ports to British ships.

## XXVIII.—MOTORS AND BICYCLES.

### 1. Why is petrol used for driving motors ?

Petrol, unlike paraffin oil, very readily turns into vapour. By means of an electric spark this vapour is made to explode. These explosions, which follow each other in rapid succession, are directed upon the piston which is thus made to move. The rapidity with which petrol turns into vapour makes it necessary to keep the petrol in sealed tins. This also explains why it is so dangerous to bring a naked flame anywhere near petrol.

### 2. What is meant by a "push" bicycle? What disadvantages were there in the old fixed-wheel type?

By a "push" bicycle is meant one which is not propelled by a motor.

The old fixed wheel bicycle resulted in a great loss of energy in going down hill or down slopes as the feet were constantly moving. With the new free-wheel type this force is reserved, and there is far less strain upon a most important part of the bicycle—the chain and bearings.

### 3. What means have been adopted in some makes of bicycle to minimise vibration?

A system of springs has been introduced in some makes of bicycle. Such bicycles are said to have "spring" frames. The front fork is also fitted with springs so that when a stone is run over, jarring is reduced to a minimum.

## *Size of Bicycles—Warning to Motorists*

**4. What is the danger of leaving a pneumatic-tyred bicycle in the hot sun ?**

If the tyres are inflated very hard, there is danger of a burst owing to the expansion of the air in the tyre when heated by the sun. Should a tyre be wearing or should there be a weak spot in it the danger is increased.

**5. Many people ride bicycles which are either too large or too small for them. How can a person test whether a bicycle fits him ?**

A person can test a bicycle for size by sitting on the saddle and extending the legs to full length. The foot should then comfortably rest on the pedal at its lowest point. When the bicycle is ridden the legs will then be fully extended and the rider is able to put his whole strength into the action.

**6. What notice often meets the eye of the motorist as he enters a town ?**

A sign is often seen bearing the advice "Motorists are requested to drive slowly through the borough." In other cases a "speed-limit" sign is found. This consists of a white disc with a number below—usually 10—indicating the number of miles per hour beyond which the car must not travel.

**7. How is the air retained in a tyre ?**

This is effected by means of a valve. When air is pumped into the tyre the valve is forced open. The pressure of the air in the tyre automatically closes the valve after each stroke of the pump.

**8. When is an inner tube said to be "perished" ?**

An inner tube is said to be "perished" when it is no longer able to retain air. The tyre goes down gradually,

## ***Punctures—Carburetters—Tyres***

and when tested no puncture can be located as the air escapes through the "body" of the tube. The only way of satisfactorily dealing with such a tube is to discard it.

**9. Say how you would test an inner tube to locate a puncture ?**

The inner tube should be taken out, and inflated until it is full of air. The tube should then be put close to the face and squeezed. This process is repeated until a current of air is felt. This current shows where it is punctured. Should the operation be unsuccessful the tube should be passed through water, when air bubbles will rise from the puncture.

**10. What is a carburetter ?**

The carburetter is that part of a motor which enables the petrol to be turned into vapour. Air is drawn into the carburetter and mixes with the petrol spray forming an inflammable vapour. This is drawn into the cylinder of the engine where the vapour is exploded. The resulting force is used to drive the motor.

**11. Say how you would replace a cycle tyre without the aid of tools ?**

The inner tube should be slightly inflated and placed in position. The outer cover should next be put on and the finger and thumb should be run round to clear the cover of the rims. When the last portion of the outer cover is to be put on, let the air out of the inner tube. It will then be an easy matter to push the remainder of the cover over the rim with the fingers and thumbs.

**12. What is the reason of the small puff of smoke often emitted at the back of a motor car ?**

This consists of the burnt gases which are forced through the exhaust valve at the back of the car.

## *Cycle Brakes—Motor Cylinders*

**13. In going down-hill a cyclist's brakes fail to act. What should be done to stop the machine?**

The rider should be prepared for such an emergency. Many are able to apply the ball of the foot to the tyre of the front wheel immediately in front of the fork. It would be almost impossible for a lady rider to adopt this practice, but with men it is practised with success.

**14. On the back hubs of many bicycles a leather strap or piece of string is to be seen. What is the reason for this?**

This simple device is used to keep the back hub clean and bright. It is customary to see an accumulation of mud and grease collected there owing to the escape of oil from the bearings. As it is difficult to clean the hub this practice is a very useful one.

**15. How are the cylinders of a motor kept cool?**

These are kept cool by means of water which circulates round them. The hot water passes through a coil of pipes called a radiator which is found in the front of a car, and the cold air which meets the car rushes between them, thus cooling the water which can be used over and over again.

In the case of motor cycles, rings of metal in contact with the air carry off the heat, which then radiates from the surface of the metal.

**16. A person cycling in winter usually finds that his hands and feet suffer from cold. In what simple way can this be avoided?**

By wearing cuffs on the wrists and gaiters on the ankles, much unnecessary discomfort can be avoided. The hands and feet are kept far warmer than if this precaution is neglected.

## ***Cleaning Bearings—Rule of Road—Signs***

**17. The bearings of a bicycle are dirty and noisy. How can they be cleaned in a simple way ?**

By squirting paraffin through the bearings. This carries away the dirt. The process should be repeated until the paraffin runs away in a clear stream. Lubricating oil should then be applied.

**18. What is the " rule of the road " ?**

Cyclists and vehicles keep to the left of the road.

**19. How does a motorist know when he is approaching a dangerous corner or cross roads ?**

A red triangle mounted on a support, warns motorists of dangerous corners, cross roads, steep hills, etc. This sign is to be found in all parts of the country.

**20. Why are the tyres of motors often " studded " ?**

The reason for this is that they will be able to get a better grip on the surface of the road and so reduce skidding which is very dangerous.

## XXIX.—MUSIC.

**1. What are wind instruments? Are they of modern introduction?**

A wind instrument is so called because the sound is due to the vibration of a column of air. The wind instruments now in use are of comparatively recent introduction. Instruments used from the very earliest times include the flute, pipe, lyre, harp, timbrel, and sackbut. The sackbut was a very primitive form of wind instrument.

**2. What causes the sound when a note is struck on a piano?**

The hammer strikes a wire made of the finest cast steel and sets it vibrating. This vibration sets up waves in the air surrounding the spring. The air waves reach the ear and affect it.

**3. What is meant by a "grand" piano?**

A "grand" piano is one which is made in the large horizontal shape. The "grand" piano is the finest form in which the piano is made. Its tone-producing power is much greater than that of the upright piano.

**4. Why are the hammers in pianos covered with a soft material?**

The material used for covering hammers is usually felt. If a harder material were used the sound produced would be shrill and metallic. If a softer material were used the sound would be dull and lifeless.



## *Piano Notes--Musical Terms*

5. What precaution is taken to prevent the notes of a piano continuing to sound and so causing a confusion of sounds? The intermingling would cause confusion.

If a succession of notes varying in pitch were played and the corresponding strings allowed to vibrate till the vibration died away, the intermingling of discordant sounds would result in confusion. To prevent this a "damper" is provided. This rests against the strings and prevents vibration when in its normal position. As soon as a note is struck it leaves the strings and allows them to vibrate, but resumes its normal position when the key rises.

6. What is meant by (a) a "trichord piano"? (b) "full compass"? (c) "loud pedal"?

(a) A "trichord piano" has three strings tuned in unison, to each note, except in the case of the lowest bass notes which only have one. (b) By "full compass" is meant seven octaves. (c) The "loud pedal" is one controlled by the right foot, which when pressed down removes the dampers collectively from all the strings, with the result that the vibrations are more sustained and of lower tone.

✓7. What is the difference between (a) music? (b) a noise?

Vibrations in regular succession produce a pleasant sound and go by the name of musical notes. When vibrations are produced in an irregular way the resulting sound is unpleasant, and is termed a noise.

8. What are the vocal chords?

The vocal chords are two bands of elastic tissue stretching side by side across the top of the larynx,

## *Orchestra—Band—Singers*

at the upper part of the windpipe. When breathing, these chords are wide apart, but in speaking or singing they are brought close together leaving only a narrow opening called the glottis. When air is forced through this opening it causes the vocal cords to vibrate.

9. What difference is there between an orchestra and a band ?

A band consists of a number of performers using any kind of musical instrument. The term "orchestra" is understood to imply that stringed instruments played with the bow, form an essential part of the combination.

10. Why do famous singers often use the French or Italian language when singing ?

French and Italian are free from gutturals. These languages are therefore musical in themselves.

11. What steps are taken in some of the leading provincial towns to provide music cheaply for the population ?

In some towns of England the corporation employs a skilled organist to give recitals on organs specially built for the purpose. These recitals are generally given on Saturdays. Frequently short notes descriptive of the pieces to be played are supplied at a small cost.

12. Are the best natural singers generally found in mountainous or flat districts, and why ?

It has been found that people living amongst the mountains and hills are usually better natural singers than those residing in plains. The people of Wales and Yorkshire are noted for their musical capacities, the fresh mountain air no doubt exciting a beneficial effect upon their vocal chords.

## *Organ Pipes—Oratorios—Metronome*

### **13. Why do the pipes of an organ vary in size ?**

To secure differences in tone. Long narrow pipes produce a soft and sweet tone, whilst shallow wide pipes give a powerful hollow sound. Square pipes produce a broad full tone.

### **14. What facts go to prove that music is a natural way of giving expression to one's feelings ?**

In case of rejoicing or sorrow, or for devotional purposes, we call in the aid of music. No important ceremony is complete without music.

### **15. What is an oratorio ?**

An oratorio is a drama of a sacred type, and requires a large number of singers and instrumentalists.

### **16. Name some of the most popular oratorios in use at this time, and say by whom they were written ?**

The most popular oratorios in use at the present time are : "The Messiah" (Handel). "St. Paul" (Mendelssohn). "The Creation" (Hädel). "Elijah" (Mendelssohn). Others which are now generally regarded as oratorios, are : "Mount of Olives" (Beethoven). "The Redemption" (Gounod). "Last Judgment" (Spöhr). "The Apostles" (Elgar).

### **17. What is a metronome ?**

A metronome is an instrument with a pendulum which is used for beating time. The pendulum can be regulated so as to swing any given number of times per minute.

## *Musical Terms—Flat Singing*

18. The following indication appears at the beginning of a piece of music :  $M \text{ } \text{♩} = 124$ . What does it mean ?

$M \text{ } \text{♩} = 124$ , when placed at the commencement of a piece of music, signifies that the music is to be performed at the rate of 124 crotchets per minute.

19. What are the main causes which lead to "flat" singing ?

The following are some of the causes which lead to flat singing : (a) Breathing through the mouth. (b) Physical weakness. (c) Irregular breathing. (d) Fatigue. (e) A stuffy atmosphere. (f) Forcing of the voice.

20. What is meant by (a) staccato ? (b) rit. ? (c) cresc. ? (d) prestissimo ?

(a) Staccato means "with the notes cut short." (b) Rit., Ritard, or Ritardando means "decreasing in pace." (c) Cresc., crescendo, < means "increasing in loudness." (d) Prestissimo means "as quickly as possible."

## XXX.—PAINTING, ART.

**1. What is the difference between an artist and an artisan ?**

An artist is a person whose work is of a creative nature. An artisan is one whose work is imitative and mechanical. Between the two comes the artificer who puts less of the idealistic and creative into his work than the artist, but more intelligence and taste than does the artisan.

**2. How did the members of the ancient Egyptian civilisation represent the outstanding events in the history of their nation ?**

From the earliest times it has been the custom to record important events and social customs by means of pictures. The Egyptians used a kind of picture writing with which they decorated their temples, vaults, coffin cases, etc. This writing is known as hieroglyphics or symbolic signs. Much time has been devoted to investigating these, and many of them have been read and explained.

**3. What do you know of the " Bayeux tapestry " ?**

The Bayeux tapestry was a linen roll 77 yards in length, on which was embroidered in coloured worsted fifty-eight scenes representing the life of William the Conqueror. It is supposed to have been the work of his wife Matilda. It is preserved to the present day at Bayeux, Normandy.

**4. What is (a) an artist's model ? (b) a palette ? (c) a curator ?**

(a) An artist's model is a person who does duty as a copy for an artist. (b) A palette is a thin oval-shaped

## *Etchings—Pigments—Lithography*

plate made of wood or porcelain and used by artists for holding or mixing their paints. It is usually provided with a thumb-hole for ease in holding. (c) A curator is a person placed in charge of a museum or art gallery.

### **5. What is an etching ?**

An etching is a kind of engraving in which the lines scratched on the prepared metal plate by an etching needle, are produced by the biting of an acid. The plate is prepared by covering it with a thin coat of wax or varnish. On this the design is scratched and the exposed part of the plate subjected to the action of the acid.

### **6. What are pigments ?**

Pigments are dry earthy substances which when mixed with suitable liquids form oil-colours or water-colours. They are obtained chiefly from minerals. Water-colours are so called because they are rendered semi-fluid by the addition of water ; oil-colours because the pigment is treated with oil.

### **7. What is a lithographic artist ?**

A lithographic artist is one engaged in the operation of producing printed matter from a lithographic stone, on which a drawing, design, or transfer has been made in soapy ink, or other suitable medium. The stone is damped on those parts where the design is not to appear. This prevents them from taking the ink.

### **8. What steps are taken to perpetuate important events ?**

Artists of repute are commissioned to represent their impressions on canvas, in order that future generations may have some idea of what actually took place. Coronations of Sovereigns and great battles are typical subjects for illustration.

## *Colours—Mixing—Art Terms*

9. Name any colours used in picture painting which are supplied by the animal world. Name also some obtained from the vegetable world.

(a) Sepia is supplied by the cuttle-fish, the fluid from which is treated with caustic alkalis. Cochineal is obtained from the dried body of the cochineal insect.

(b) Indigo is obtained from the indigo plant. Madder is obtained from the madder plant. Sap-green is obtained from various plants.

10. What are the colours of the rainbow ?

The colours are red, orange, yellow, green, blue, indigo, violet—arranged in this order with the red outside.

Sometimes a faint rainbow is seen outside the primary bow with the order reversed.

11. A person has three colours in his paint box—red, blue, yellow. Show how he can produce secondary and tertiary colours by mixing any of these three ?

Red and blue mixed produce purple. Blue and yellow mixed produce green. Red and yellow mixed produce orange. Purple and green mixed produce olive. Green and orange mixed produce citron. Purple and orange mixed produce russet.

12. How did the dwellers of the caves represent their impressions artistically ?

In the time of the cave dwellers rude representations of incidents in connexion with their lives, were made on the bones of wild animals.

13. What is meant by (a) a fresco ? (b) a stencil ?

A fresco is a wall-painting, and is so called because it was originally painted on fresh plaster, that is, plaster which had not had time to dry. This allowed the colour

## *Cartoons—Caricatures—Pictures*

to sink into the plaster. A stencil is a thin plate of metal or other material in which a pattern is cut, which is to be used in marking out such pattern in colour.

**14. What is (a) a cartoon ? (b) a caricature ?**

(a) A cartoon is a pictorial sketch dealing with a social or political subject of current interest. (b) A caricature is a pictorial representation of a person or thing in which defects, irregularities, or peculiarities, are exaggerated to such an extent as to make them ludicrous.

**15. Which artist made a special feature of painting the Blessed Virgin and the Christ ?**

Raphael, an Italian, was renowned for his paintings of the Madonna and the Child Jesus. The world-famous picture "The Madonna Ansdei" by Raphael, is now in the National Gallery in London. His pictures though simple in theme and style, were nevertheless well nigh perfect.

**16. By whom were the following famous pictures painted : (a) "Mona Lisa" ? (b) "The Light of the World" ? (c) "Salisbury Cathedral" ? (d) "Maids of Honour" ? (e) "The Holy Family" ? (f) "An Old Woman" ? (g) "The Garden of the Loves" ?**

(a) Leonardo Da Vinci—it is now in the Louvre in Paris. (b) Holman Hunt—this picture encouraged religious art at a time when it was falling into neglect. (c) John Constable—one of England's greatest landscape painters. (d) Diego Velasquez—one of the world's greatest masters—a Spaniard, born 1599. (e) Michael Angelo—a marvellous sculptor and painter. (f) H. van Rhyn Rembrandt—A Dutch master and a contemporary of Velasquez, Rubens, and Van Dyck. (g) Titian, a Venetian, who was the greatest colour painter of all time.



## *Hogarth—Turner—Ruskin*

**17. Which great English painter revealed the follies of the age in which he lived ?**

William Hogarth used his pictures to open the eyes of the people to the vices and follies of the age in which he lived. He exposed the real character of people in his pictures, and made them ashamed of their shortcomings. He painted coarse and vulgar things to bring people to see the horror of them.

**18. Which artist is said to have "stolen the sunshine" and put it into his pictures ?**

Turner was the artist who depicted the sunlight better than any other man. His pictures of landscapes, seascapes, clouds, etc., are of outstanding merit. On his death he left them to the nation.

**19. What is mosaic work ?**

Mosaic work is decorative work made by fitting together pieces of glass, stone, etc. It is often used for floors. Great artists have done mosaic work that has the smoothness and delicacy of painting.

**20. Who wrote the book called "Modern Painters," and what caused him to do so ?**

John Ruskin. He wrote it because he passionately loved beautiful things, and wished to bring home to his readers the beauty of paintings and buildings. He held the opinion that a nation's soul is shown by the buildings it erects and the pictures it admires.

## XXXI.—PARLIAMENT.

**1. When a man or woman enters a polling booth to register a vote what is the method of procedure ?**

The elector goes to the table at which the clerk sits, and the latter asks for the name and address. The list of voters is then consulted and the clerk hands a voting paper to him or her with his or her distinguishing number on it. On this are the names in alphabetical order of the candidates seeking election. The voter then goes into the polling-booth and puts a X against the name or names of persons he or she wishes to vote for, and places the paper in the ballot box.

**2. Two persons poll exactly the same number of votes at an election. How is the election settled, and what very often happens in such a contingency ?**

In the case of a "tie" the "Returning Officer" may give his "casting vote," but this rarely happens in actual practice. When very few votes separate the candidates the unsuccessful one demands a recount to see if any mistake has been made in counting.

**3. What is meant by bribery, and how is it punished ?**

Bribery is the act of giving or promising a gift or money with the object of inducing an elector to vote for a certain candidate. If an elected candidate or his agent is found guilty of bribery, he loses the seat. Any one found guilty of bribery is heavily fined or imprisoned.

**4. What is the advantage in having all elections on the same day ?**

During election time the country is in a state of excitement, and business is seriously interrupted. Having the

## *The Ministry—Chiltern Hundreds*

elections on one day reduces this disturbance to a minimum. There is the further advantage that the results in one set of constituencies do not unduly influence the electors in other constituencies.

### **5. What is meant by "forming a Ministry"?**

After a parliamentary election the Sovereign sends for the leader of the party which has a majority in the House of Commons and requests him to form a ministry, that is to select the men who are to occupy the offices of State.

### **6. Who controls the business in the House of Commons?**

The business of Parliament is controlled by the Speaker. He calls upon speakers, and in case of dispute he gives a decision which is final and binding. He is the "first commoner" of the realm.

### **7. A Member of Parliament wishes to retire from Parliament. What steps must he take to secure his release?**

In theory a member may not retire from Parliament. This difficulty is got over in the following way. A Member of Parliament is not allowed to hold a Government office without vacating his seat and seeking re-election. Hence a member wishing to retire applies for the post of "Stewardship of the Chiltern Hundreds," which is a Government office without pay or duties. This is always granted on application, and accordingly resignation is effected in this way.

### **8. Where are the official residences of most of the leading members of the Government? What is the advantage of this arrangement?**

The leading members of the Government have their official residences in Downing Street, London. The

## ***King's Speech—Speaker—Hansard***

advantage is that they are in close touch with one another and consequently are able to confer on important matters of State at very short notice and with little loss of time.

### **9. What is meant by " the King's or Queen's Speech " ?**

The King's or Queen's Speech is delivered in the House of Lords when Parliament re-opens after a recess. The proposed measures for the coming session are outlined, reference is made to the relationship with foreign powers, and a Divine Blessing is invoked on the work of the session. The speech is prepared by the Cabinet.

### **10. A member in the House of Commons refuses to obey the ruling of the Speaker. What happens in such a case ?**

An unruly member is called to order by the Speaker and asked to withdraw his disorderly statement. If he refuses he is named. He is then requested to leave the House. If necessary he is removed by force, constables under the charge of the Sergeant-at-Arms being called in. A motion may be carried suspending the unruly member for the rest of the session.

### **11. A person wishes to read a full account of the speech of a certain Member of Parliament, delivered in the House of Commons. Where can a full report be found ?**

Full reports of all speeches in the House of Commons are to be found in " Hansard," the official reports of the British Parliament.

### **12. What do you know of the term " Black Rod " ?**

When Parliament is opened by the Sovereign, the Black Rod, as the official messenger is called, requests the members of the House of Commons to proceed to the

## ***Lord Chancellor—"Gilded Chamber"***

House of Lords to hear the King's or Queen's Speech read from the throne.

**13. What objection is there in a Government remaining too long in office ?**

If a Government remain in office too long, there is the great danger that it will fail to represent correctly the views of the electors.

**14. "The Lord Chancellor took his seat on the Woolsack" is an expression constantly met with in the daily newspaper. What does it signify ?**

The Lord Chancellor presides over the House of Lords just as the Speaker presides over the House of Commons, although he has not quite the same arbitrary powers. His seat is "The Woolsack," which remains to remind us of the days when wool was the staple trade of England.

**15. What is meant by the "Gilded Chamber" ?**

The "Gilded Chamber" is the Upper House or House of Lords, where all the pageantry connected with Parliamentary procedure is enacted. In keeping with this the House of Lords is much more ornate than is the House of Commons.

**16. When is the House of Commons said to "Go into Committee" ?**

When a bill is presented to the House of Commons, it usually passes the "First Reading" without any criticism being offered. At the "Second Reading" there is usually a debate on the general principles of the bill. If the second reading be carried the House goes into committee, when the various clauses of the bill are discussed, criticised, and amended, according to the views of the majority of the members.

## *Parliamentary Expressions*

17. What is meant by (a) "The Front Bench" ?  
(b) "The Opposition" ?

(a) Ministers sit on the "Front Bench" on the Speaker's right. Hence the term is used instead of "ministers." (b) The Opposition consists of the party or parties which do not agree with the general policy of the Government.

18. What is a "mock parliament" ?

A "mock parliament" is an imitation parliament. Some debating societies carry on debates with the formalities and procedure which have made parliament a fair debating assembly.

19. "The bill was read for the third time" is an everyday parliamentary expression. What does it mean ?

After a bill has been amended in committee, the bill as amended is once more discussed and minor amendments made. This is the Third Reading. After the Third Reading is carried the bill is said to be "through," whether the reference is to the House of Commons or the House of Lords.

20. What are (a) "Whips" ? (b) "Tellers" ?

(a) The whips are the men who are chosen to keep their members active, and to have them available when "divisions" are about to be taken especially if such divisions are of an important nature.

(b) The "Tellers" are members selected to count the votes of the "Ayes" and "Noes" when a division is taken in the Houses of Parliament.

## XXXII.—PERSONAL HYGIENE.

1. Explain the statement that "cleanliness is next to Godliness."

Second only in importance to Godliness comes cleanliness, as without it health and happiness are impossible. By failing to practice cleanly habits we are not only unfair to ourselves, but to those amongst whom we live. Unless the skin be kept thoroughly clean a hard layer of dirt forms upon it. This chokes the sweat glands and prevents them carrying out their functions properly. More work is thus thrown upon the lungs and kidneys, which also help in ridding the body of waste products, and they are liable to get out of order. Illness follows as a result.

2. How is it that a warm glow is felt by a healthy person after indulging in a cold bath?

The cold water drives the blood from the surface of the body towards the heart. The heart sends it back again with greater force, and this return of the blood to the skin causes a warm glow to be felt all over the body. If the heart is weak, it is unable to drive the blood back and the body remains cold.

3. Why is it best to have a hot bath immediately before bedtime?

The hot water causes the blood-vessels near the surface of the body to expand, and the blood flows towards them in increased quantities. The blood parts with its heat very rapidly, and the body as a result feels a sensation of chilliness. It is wise to go to bed at once, or else to rub the body down with a cold sponge and cause the blood vessels to contract again.

## *Swimming—Rules for Eating*

### **4. Why is swimming an excellent means of recreation ?**

Swimming combines exercise and ablution. No exercise brings so many muscles into action. It is also valuable as a means of saving life.

### **5. Which part of the day is most suitable for people in ordinary health to indulge in swimming ?**

• The best time to bathe is midway between breakfast and luncheon. It is unwise to bathe shortly after taking a meal as cold has an injurious effect on digestion. The strong and vigorous may with safety bathe in the early morning, having previously taken a cup of tea or coffee and slight refreshment.

### **6. What points should be borne in mind by those who bathe in the sea or in swimming baths ?**

On entering the water the bather should completely immerse the body in order that all parts may become cooled at the same time. Immediately there is any feeling of chilliness he should at once leave the water. Strong swimmers are able to remain in the water much longer than those who are unable to swim because the exercise keeps them warm. After leaving the water the bather should have a brisk rub down and dress at once.

### **7. In order that the food we eat should benefit us to the fullest extent, what simple rules should be observed ?**

(a) Meals should be taken at regular hours. (b) Food should be eaten slowly, and masticated thoroughly. (c) Reading should not be indulged in during meal times—a pleasant chat is preferable. (d) Very hot food is harmful. When cooled it does not injure the delicate membrane of the mouth and throat. (e) Overfeeding is the cause of much suffering and ill-health.



## *Condiments—Tea—Alcohol*

### **8. What precautions are taken to prevent adulteration of food ?**

Local authorities appoint men and women as food inspectors. They are authorised to enter premises where foods are sold. They have power to demand samples of food exposed for sale, in order that they may be tested as to purity and fitness for consumption. Unsound food often causes poisoning and may result in death.

### **9. Why should condiments be used sparingly ?**

Condiments are merely stimulants and not food. They sometimes create an appetite when there is no hunger. In such cases they are harmful. Food should not be taken unless the desire for it is a natural one. If taken in excess they dull the sense of taste, and unsound food might be taken without any knowledge of the fact.

### **10. Which beverage is said to “cheer but not inebriate” ?**

William Cowper refers to “the cup that cheers but not inebriates”—meaning tea. Taken in moderation tea acts as a stimulant upon the nervous system, relieves headache, and produces a feeling of refreshment and invigoration. Only when taken in excess are its effects harmful, resulting in indigestion, loss of appetite, etc. “Stewed” tea is always harmful.

### **11. What are the main objections to the excessive use of alcoholic drinks ?**

(a) They do not act as foods. (b) They do not increase muscular vigour or mental capacity. (c) They result in temporary exhilaration followed by great depression. (d) They result in chronic poisoning. (e) They weaken the forces which resist disease. (f) They retard recovery in case of illness. (g) They pervert the moral nature.

## *Care of Teeth—Rest—Nails*

(b) They shorten life, as shown by the returns of Insurance Companies and Friendly Societies.

✓ 12. Name some common practices which are liable to injure the teeth.

(a) Eating very hot or very cold things damages the enamel on the teeth. (b) Cracking nuts or opening pocket knives with the teeth, or picking the teeth with pins and needles, breaks the enamel and then decay sets in and severe pain follows.

✓ 13. When should the teeth be cleaned, and why ?

The teeth should be cleaned before going to bed in order that any particles of food which may have remained between the teeth after eating may be removed. If left through the night this food decays. The enamel is impaired and the tooth begins to rot

✓ 14. Why do we feel refreshed after a night's sleep ?

During sleep there is less waste of tissue than when the body is active. Building up of the tissues, however, still goes on and waste products are removed. Hence the bodily energy is increased by sleep. Bedrooms should be well ventilated so that the blood may carry sufficient oxygen to the tissues without unnecessary fatigue to the muscles connected with the lungs and heart.

✓ 15. Why is a smoky atmosphere not good for the health ?

Sunlight is essential to a healthy life, and where there is much smoke there is little sunshine. Sunlight destroys disease germs, especially consumption germs.

✓ 16. Why should we always keep our hands and finger nails clean ?

When eating the hands are constantly brought into contact with our food. If the hands are dirty, poisonous

## *Juvenile Smoking—The Ear*

matter may be taken in with the food. The hands should always be washed before a meal is taken, and the finger nails should be kept clean.

### ✓ 17. What harmful effects follow upon juvenile smoking?

(a) It checks the development of the organs. (b) It affects the nervous system and has very harmful effects on the eyesight. (c) It seriously affects the action of the heart. (d) It affects the appetite and digestion. (e) It induces laziness and indifference.

### ✓ 18. Why are flies unwelcome, and what steps should be taken to prevent them increasing?

Flies are carriers of disease, and only live where dirt is to be found. Waste vegetables and other products should not be deposited in a heap near the house, but should be burnt. It is in such deposits that flies lay their eggs.

### ✓ 19. Why is it dangerous to push any small article into the ear?

Because the membrane of the drum of the ear, which is quite thin, may be perforated. If once broken it cannot be repaired, and deafness follows. A hard blow on the ear may have a similar result.

### ✓ 20. Why is it important to form the habit of sitting correctly?

By stooping forwards and lolling, people grow round-shouldered. Curvature of the spine is induced by sitting with the body twisted. To sit properly, the body should be square, the head held erect, and the shoulders kept well back.

## XXXIII.—PETS.

**1. What creatures usually treated as pets are of great service in active warfare ?**

Pigeons and dogs. Pigeons are used to carry messages when other means are not available. For example, it is sometimes possible to release homing pigeons behind the enemy lines. The message is placed in a small container attached to the pigeon's leg.

Dogs have been trained to carry messages in the war zone, and to assist in finding the wounded.

**2. How does the cat manage to keep its claws sharp ?**

The claws are the cat's chief weapon both for attack and defence. It is important, therefore, that they should be sharp. When not in use, and especially when the cat is walking, the claws are withdrawn into sheaths.

**3. Why do gold-fish kept in a bowl of water very often die ?**

The reason very often is that the water is not "fresh," that is it lacks oxygen without which no creature can live for any length of time. The fish takes this oxygen from the water by means of gills. A jar of water contains very little of this gas. It is soon used up, and unless fresh water is supplied the fish will die.

✓ **4. Of what use are whiskers to the members of the feline family ?**

The ends of the whiskers of the cat family are very sensitive. When prowling about at night the whiskers enable the cat to detect obstacles, and to estimate the size of a gap in a hedge or thicket.

## *Pets and their Treatment*

**5. Why do birds and poultry "moult" at certain times?**

Practically all living creatures change their coverings at certain times of the year. In the case of birds and poultry this is especially necessary as feathers are often broken and dirty. The feathers are gradually renewed.

**6. How can we help the birds during a severe winter?**

Many people have a habit of putting up a coco-nut or a box containing food in the garden during severe weather. Water also should be supplied, as very often water in ponds and streams is frozen up during frosty weather.

**7. What steps would you take if your pet canary broke its leg?**

This is an accident which frequently happens with cage birds, owing to fright and similar causes. A simple splint should be placed along each side of the leg and bound by narrow strips of linen. The method is the same as when a man's leg or arm is broken.

**8. Which sense is very keenly developed in the dog, and why?**

The sense of smell is extremely well developed in the dog, and especially in bloodhounds, foxhounds and terriers. By the sense of smell the dog is able to detect strangers, and to track men if specially trained for the purpose.

**9. Why do dogs make more noise than cats when they run along?**

When cats run along they are able to do so noiselessly, because of the soft pads underneath the feet. These

## *Distemper—Cats—Birds*

serve as cushions. Although dogs have pads also, there are in addition the dog's claws, which he is unable to draw into sheaths, like the cat. The contact of the dog's claws with the hard road or floor causes the noise.

**10. Many dogs suffer from an ailment known as "distemper." How can this often be prevented?**

If a dog is carefully housed and fed and kept free from infection, it is unlikely to have distemper. Distemper is most infectious, and can be contracted from other animals or infected materials.

**11. What warning signals do wild rabbits show?**

When rabbits feeding or playing in the fields hear a sound which suggests danger, they are said to show the white patches under their short tails.

**12. Why is a hedge-hog useful as a pet?**

A hedge-hog is useful in a garden because it feeds upon beetles and other harmful pests found in the garden. Many people keep toads for the same reason.

**13. How is it that cats can see better than we can in the dark?**

When in the dark the pupil of the cat's eye enlarges much more than is the case with the human eye. The eye of the cat then admits more light than the human eye. Hence cats are able to see much better than we can when it is almost dark.

**14. Why do we cut the claws of birds which are kept in cages?**

In the wild state the claws of birds are kept short by constant use. In a cage the claws grow on, and unless

## *Rabbits—Goats—Donkeys*

cut, would prove cumbersome and uncomfortable. Fowls prevent their claws growing to such lengths by scratching for food.

**15. Why is it unwise to give fish containing bones to cats ?**

Cats are so fond of fish that they eat it ravenously. Bones may be swallowed, and some of these may lodge in the throat or rest in the jaw, giving pain or even causing death.

**16. How do tame rabbits make their nests ?**

The mother rabbit pulls down from her own breast and makes a nest in the corner of her hutch.

**17. Many people now keep goats as pets. Why is this so ?**

Goats are largely kept nowadays to supply milk. The milk of the goat is very rich, and as the animal will eat almost anything the cost of upkeep is not heavy. They devour leaves, grass, hay, carrots, mangolds, turnips, leeks, etc. They should be kept tethered if there is any likelihood of them destroying crops belonging to a neighbour.

**18. What is the legend attached to the cross running down the centre of the back, and towards each foreleg, on a donkey ?**

This is supposed to be a perpetual reminder of the fact that Jesus Christ made his triumphal entry into Jerusalem riding on an ass.

## *Goats and Cage-birds*

**19. What rules should be followed if goats are to be kept successfully ?**

(a) They should be provided with a rough shed all the year round—they prefer a bed of earth to a wooden floor. (b) They should be milked regularly—twice a day—morning and evening. (c) They should be provided with a lump of rock salt to lick at pleasure. (d) They should be fed well.

**20. What points should be borne in mind when selecting a place in which to put a bird-cage ?**

(a) It should be hung in a position where the sun shines full upon it. (b) It should not be placed near a gas jet. (c) It should be placed out of the way of draughts.



## XXXIV.—PLANT LIFE.

- ✓ 1. What use are the visits of bees and other flying insects to flowers?

Insects fertilize many plants by carrying the pollen from one plant and brushing it over the stigmas of the flowers of other plants. The pollen sticks to the insect when it visits the flower in search of honey. Flowers so fertilized produce seeds. In some cases the pollen is blown by the wind. This method is found in many forest trees and shrubs.

- ✓ 2. How are insects attracted to plants?

Insects visit flowers to obtain honey. Some flowers attract insects by their gorgeous colours or by the perfumes which they emit.

- ✓ 3. What may be noticed about flowers which open at night?

Almost without exception they are white in colour and very fragrant. Thus the night insects are able to see them or to trace them by the strong scent given out. That insects have a sense of smell is proved by the fact that jam hardly ever fails to attract bees, wasps, etc. The chief flowers which open in the evening include honeysuckle, evening primrose, the tobacco flower, the white campion, and the night-scented stock.

- ✓ 4. What should a gardener do with his peach bloom if no insects visit it?

He must take a brush or other suitable instrument, and artificially fertilize the flowers by transferring pollen from the anthers of the flowers to the stigmas.

## *Plant Protection—Seed Distribution*

- ✓ 5. What common meadow flower is shunned by grazing cattle, and why?

The buttercup. Cattle do not relish it because it contains a bitter substance which irritates and blisters the mouth.

6. What protection has the dead-nettle?

The dead-nettle is protected by its likeness to the closely allied stinging nettle. So much alike are the two that people hesitate before attempting to pluck a dead-nettle.

- ✓ 7. Name any means of protection found amongst plants?

(a) Some store up poisonous or bitter substances, *e.g.*, the buttercup, wood sorrel, bracken ferns, speedwell. (b) Some have short sharp points, *e.g.*, the nettle, which in addition has little supplies of poison. This is deposited in the holes made by the sharp points. (c) Some are provided with spikes and sharp thorns, *e.g.*, the thistle, holly, gorse. (d) Some are provided with bodyguards. This is the case with some tropical plants which are in danger of being entirely stripped of their leaves by insects for the purpose of building nests. These plants are protected by savage ants which destroy attacking enemies. The ants use the plants themselves both as food and as homes. (e) Some have tough bark or skin.

- ✓ 8. In what ways are the seeds of plants distributed?

Some of the means are : (a) wind, (b) running water, (c) animals' bodies, (d) birds, (e) sun. In the last instance the fruits "explode" and shoot out the seeds. Examples are pansy, balsam, broom.

## *Dandelion—Mistletoe—Insects*

**9. What wild flower suggested the idea of the parachute ?**

The seeds of the dandelion have the form of little parachutes with the seed where the man is in a large parachute. The seed alights on the ground and being sharp forces its way in. The pressure of the wind on the top of the "parachute" helps to fix it in the ground more securely.

**10. How is the mistletoe seed deposited on the trunks of trees where it takes root ?**

The berries contain a very sticky substance, and when the missel-thrush or other bird has eaten mistletoe berries, his beak needs to be cleaned. To do this he rubs it against the rough bark of an apple, crab, or other tree. In doing this some of the seeds are rubbed into crevices in the bark where they take root.

**11. What prevents creeping insects from taking the honey from some flowers ?**

Often the stem is covered with fine hairs pointing downwards. These impede the insects when they attempt to crawl up the stem. Sometimes a sticky liquid is found on the hairs. This serves as an effective trap to insects. Pollen and honey removed by creeping insects are wasted, as these insects do not carry the pollen to other flowers.

**12. How is the pollen of some flowers sheltered from the rain ?**

Some flowers hang their heads. These include the bluebell and lily of the valley. Others close up their petals, e.g., the hawk-weed. In others there is an overhanging protection, as in the dead-nettle.

## *Coco-nut Palms—Plants*

- ✓ 13. Very often coco-nut palms are found growing on islands, the soil of which has never previously been cultivated. How did they get there?

Coco-nut palms frequently grow by the edge of the sea. The fruits drop and are carried away by ocean currents. Some are washed up on islands where they take root and grow.

- ✓ 14. Why do some plants grow by the waterside, whilst others prefer dry spots to live in?

Some plants are naturally thirsty, that is their leaves allow the water in the plants to evaporate quickly, and it must be restored or the plants will die. The hydrangea is an example of this type of plant. It requires copious supplies of moisture. Evergreens have hard thick-skinned leaves which do not allow water to evaporate so quickly. The cactus is an example of such a plant. It can stand prolonged drought.

15. What plant takes in food by means of cells instead of roots?

The seaweed is such a plant. If there are any roots they simply serve the purpose of anchoring the plant to the rocks. The plant can take in food at any point in the leaves, and must do so because of its surroundings.

16. What are (a) annuals? (b) biennials? (c) perennials?

(a) Annuals are plants which complete their existence in a single year. (b) Biennials are plants which take two years to come to maturity. They produce leaves and roots the first year, flowers and fruit the second. It is then more profitable to destroy the plants and replace them by a fresh stock sown earlier in the year.

## *Bulbs—Seedlings—Climbers*

(c) Perennials are the same as biennials, except that it is profitable to keep the same plants year after year, rather than to grow fresh ones from seed.

**17. Why do we put bulbous plants grown in glasses, etc., in the dark to start growth ?**

Because darkness induces root growth if other conditions are suitable. Better blooms are secured if the plant has sturdy roots. When bulbs are planted in the ground they produce sturdy roots without this treatment.

**18. Name the conditions under which seedlings may be grown on flannel, in sawdust, etc. ?**

The seeds must have air, warmth, and moisture to induce germination. When cress, etc., is grown in this way the plants feed on the food stored up in the seeds themselves.

**19. Name some methods used by plants in climbing ?**

(a) The stem twines round the support, as in the case of bindweed and runner beans. (b) The leaf stalks act as tendrils, as in the nasturtium and clematis. (c) Tendrils, as in the pea and vine, twine round the supports. (d) The plant is held up by hooks, as in the bramble and dog rose. (e) Roots hold the plant to the support, as in the ivy.

**20. What flower keeps open day and night, and why ?**

The honeysuckle keeps open day and night. It is visited by both day and nocturnal insects.

## XXXV.—THE POST OFFICE.

### 1. Why are street pillar-boxes painted red ?

The bright red colour catches the eye so that it is easy to find the pillar-box. "Post Office red" is the distinguishing colour of the Post Office and is used on Royal Mail vans, etc.

### 2. How can you ascertain whether the public can telephone from a post office without asking any question ?

A bracket sign, white in colour and with the national coat of arms in red, is placed in a prominent position near the entrance to the post office.

### 3. Very often perforated letters are noticed on postage stamps. Explain this practice ?

Large firms using great numbers of postage stamps frequently perforate their stamps with the initials of the company in order to prevent misappropriation of the same by those who have ready access to them.

### 4. Are postage stamps used for any other purposes besides prepayment for letters ?

Postage stamps have been used for advertising and propaganda purposes. The nearest approach in England to this practice is the post-mark "Buy War Bonds." Some of the smaller British States have very elaborate stamps. These States add to their revenues by selling the stamps to collectors.

### 5. A merchant wishes to post a large number of letters. How can he manage to overcome the difficulty of affixing stamps to such a consignment ?

When a large number of letters are to be dispatched, it is possible to arrange for post office vans to collect

## *Postage Surcharge—Redirection*

them. The sender may pay postage in a lump sum thus avoiding waste of time in affixing stamps. This practice is usually confined to letters containing circulars, advertisements, etc. Such communications are franked with the word "paid," and no stamp is used.

**6. A person inadvertently drops a letter into a pillar-box, not having previously affixed a stamp. State what will happen ?**

The letter will be delivered in the ordinary way, and a voucher will be attached to the face of the envelope stating the amount of surcharge the recipient must pay. This charge is double the usual postage. If he decides to refuse the letter it is taken back to the post office.

**7. A man goes to reside in a certain town for a short time, but has no settled address. How may he arrange for his letters to reach him ?**

The letters should be addressed to the main post office of the town in which the person is to stay. In addition to the name of the person and the address of the post office, they must bear the words "to be called for." This is a great convenience to strangers and visitors who are without a permanent address. The post office agrees to retain such letters for a period not exceeding two months.

**8. A family goes away for a holiday and wishes to have letters sent on. How can this be done ?**

Previous to going away a form should be filled in and handed in at the local post office. All letters will then be re-directed free of charge.

## *Registered Letters—Civil Servants*

**9. A package sent by post is of great value. What steps would you take to ensure its safe delivery ?**

The package should be registered at the post office, and a receipt obtained in exchange for the fee paid. In the case of parcels it is necessary to seal all places where string has been tied, or the postal authorities will refuse to accept them. Compensation is paid subject to certain rules, in case of loss. The "Post Office Guide" contains full information as to all regulations in connexion with this department of the State.

**10. A person wishes to take up a career in the Post Office as a member of the staff. What steps are necessary in order to secure such a post ?**

Examinations are held periodically. These are open to all British subjects, and are advertised when they are due to take place. The examination test makes favouritism impossible. Only those who show themselves capable and deserving secure the appointments. Government officials are called "civil servants."

**11. A person just misses the post, but is anxious that his letter should be sent on immediately. How could this be done ?**

The letter could be sent on by the next train. Railway companies will accept letters for conveyance provided that in addition to the ordinary postage a fee is paid to the railway company. This fee is generally fixed at twopence.

**12. You send a letter to a friend, but are not certain that it will reach the person for whom it is intended. What would you do under the circumstances ?**

Write on the front of the envelope your own name and address preceded by the words: "If undelivered, to be returned to —"



## *Parcel Post*

**13. How is the collection of letters arranged for in remote and scattered districts ?**

The collections are so arranged that the postman empties the boxes as he goes round delivering letters. Thus special journeys are avoided.

**14. A person wishes to send a parcel of dangerous substances by post. Is this permissible ?**

The Postmaster-General has power to stop letters which are of an offensive or indecent nature. Parcels containing explosives, obnoxious materials, or living creatures are not accepted. Bees are an exception and may be sent by post, if the regulations are followed.

**15. How can money be sent by post ?**

Coins may be sent in a registered envelope. Money may also be sent in the form of postal or money orders, or it may be telegraphed. In the latter case besides the poundage, the sender must pay for a telegram to the one who is to receive the money.

**16. Why is it essential that the work of the Post Office should be carried on by the Government ?**

(a) Because secret and confidential messages are transmitted, and it is safer to trust private messages to a State department than to a private person or company. (b) Because in time of war it is absolutely essential that the State should have complete control over the system of telephones, conveyance of letters, etc., in order that anything of a treasonable or dangerous nature can be intercepted.

**17. Only parcels of a certain size can be carried by post. What are the limits ?**

They must not exceed 11 lb. in weight, 3 ft. 6 ins. in length, and length and girth combined, 6 ft.

## *Mail Train—Circulars by Post*

**18. What is a " mail train " ?**

Mail trains are trains which have a travelling post office attached to them, the letters being sorted as the train goes along. Stands are erected beside the railway track to receive bags of letters ready sorted for the area in which the bag is released.

**19. Certain communications can be sent by post in envelopes open at one end for a half-penny. State the nature of such correspondence.**

Certain missives such as 'cards, invoices, circulars, sketches, etc., may be transmitted through the post in envelopes which are left open at a cost of  $\frac{1}{2}d$ . Ordinary letters if sent in this way are liable to a surcharge of  $2d$ . If in doubt as to the advisability of using this means, the officials of the post office should be consulted.

**20. A person posts an unregistered letter or a postcard, and wishes to be able to prove that he has done so. How can this be effected ?**

At a cost of  $\frac{1}{2}d$ , a certificate of posting an unregistered letter, postcard, or other packet, handed in at any post office, can be obtained.

## XXXVI.—PROVERBS, QUOTATIONS.

### 1. Why are proverbs and quotations helpful ?

Proverbs often express moral truths clearly and tersely. They go straight to the point, they ignore the excuses we make to ourselves, and they remind us bluntly of our duties and obligations.

### 2. What do you know about (a) *Honi soit qui mal y pense* ? (b) *Dieu et mon droit* ?

(a) This well-known expression is the motto of those who hold the Order of the Garter. It means "Evil be to him that evil thinks." (b) "*Dieu et mon droit*" means, "God and my right." It is the ancient motto of English Sovereigns.

### 3. The following expressions are often met with in English journals and newspapers : (a) "*Hoist with his own petard*." (b) "*In the lap of the gods*." (c) "*Turn of the tide*." Explain what they mean.

(a) Originally a petard was a mortar filled with gunpowder. It was used for blowing up obstructions. The expression is from "*Hamlet*" and has the same meaning as "caught in your own trap." (b) This means that the outcome of a certain thing is uncertain. (c) This means a change which is likely to affect materially the fortunes of a person or a party

### 4. A schoolboy often sees or hears such expressions as : (a) *Esprit de corps*. (b) *Alma mater*. (c) "*Sent to Coventry*." What do they signify ?

(a) Loyalty to one's comrades. (b) *Alma mater*—a name given by graduates to their own university—a foster-mother. (c) Sent to Coventry—to take no

## *Common Expressions and Sayings.*

notice of a person in the same way that the people of Coventry formerly treated soldiers stationed there.

5. Explain the following : (a) *Mens sana in corpore sano.* (b) *Back to the land.* (c) *Au revoir.*

(a) A sound mind in a sound body. (b) This refers to the movement for a return to the old conditions when the land was cultivated by a larger proportion of the people than it is now. (c) An expression of hope of seeing one again. It is used at parting.

6. Who used the following expressions ? : (a) "I am a citizen of no mean city." (b) "More things are wrought by prayer than this world dreams of." (c) "They were lovely and pleasant in their lives, and in their death they were not divided ; they were swifter than eagles, they were stronger than lions."

(a) St. Paul. (b) King Arthur in Tennyson's "Passing of Arthur." (c) King David, when he heard of the death of Saul and Jonathan.

7. A leading article in a newspaper contains the following references : (a) "The wish is father to the thought." (b) "Alias." (c) "Bon voyage." (d) "The last straw." What do they mean ?

(a) We say that something actually is so because we desire it. (b) Alias=otherwise. (c) Bon voyage="May you have a pleasant journey." (d) Something which actually brings about a crisis. It is from the proverb "It was the last straw that broke the camel's back."

8. Express in another form : (a) "Knocked out" ; "Unable to take any further part in the fight." (b) "A blind alley" ; "A trap." (c) "By virtue of one's office."

(a) "Hors de combat." (b) "Cul-de sac." (c) "Ex officio."

9. Complete the following : (a) "Come the three corners of the world . . . true." (b) "Had I but served

## *Common Expressions and Sayings*

my God . . . enemies." (c) "The elements so mixed in him . . . man."

- (a) "Come the three corners of the world in arms,  
And we shall shock them : nought shall make us rue

If England to itself do rest but true."

("King John," Shakespeare.)

- (b) "Had I but served my God with half the zeal  
I served my king, He would not in mine age  
Have left me naked to mine enemies."  
("Henry VIII.," Shakespeare.)

- (c) "His life was gentle, and the elements  
So mixed in him, that Nature might stand up,  
And say to all the world, 'This was a man'.  
("Julius Cæsar," Shakespeare.)

10. Explain : (a) "Vis-a-vis." (b) "Sotto voce."  
(c) "Noblesse oblige." (d) "Nil desperandum."

- (a) Face-to-face, opposite. (b) Said in an undertone.  
(c) The obligation of noble conduct is imposed by noble birth. (d) Never despair.

11. In the course of a day, a man heard the following expressions : (a) "It's like pouring water on a duck's back." (b) "I gave him a Roland for his Oliver." Explain what they meant.

- (a) Doing something which does not produce the desired effect. Water poured on a duck's back runs off without wetting it. (b) This means, "I gave him as good as he gave me." Roland and Oliver were famous knights in the service of Charlemagne.

12. What is denoted by : (a) "Lapsus linguæ" ?  
(b) "Nulli secundus" ? (c) "Mal de mer" ? (d) "Locum tenens" ?

- (a) A slip of the tongue. (b) Second to none. (c) Seasickness. (d) One serving in another's place.

## *Common Expressions and Sayings.*

13. Translate the following by using single words of French origin : (a) A place of meeting. (b) Let matters alone ; don't interfere. (c) A summing up.

(a) Rendezvous. (b) Laissez-faire. (c) Résumé.

14. Discuss the statements : (a) "Honour before honours." (b) "He conquers who endures." (c) "He is to be feared who fears not death."

(a) This was a saying of General Gordon's when he was offered titles as a reward for his services. The knowledge that his conduct had been strictly honourable was more to him than titles or rewards. (b) Where there is not a very great difference of strength between opponents, the one who can hold out in spite of trials and hardships is likely to win. The endurance of the Allies in the World War is a striking example. (c) A man who does not fear death is unlikely to fear anything else. He is therefore ready to risk and dare everything, and he will not yield to threats. For these reasons such a man is a dangerous opponent.

15. Explain : (a) "Davy Jones' Locker." (b) "Spoiling the ship for a ha'porth o' tar." (c) "Ante bellum." (d) "Tempus fugit."

(a) The bottom of the sea—where the dead lie. (b) Risking the success of an important undertaking for the sake of just a little further expenditure of time, effort, or money. (c) Before the war. (d) Time flies.

16. Say what you can about the quotation :

"I am the master of my fate,  
I am the captain of my soul."

These lines are from a poem by W. E. Henley. They express the British idea that we can make or mar our fortunes by our own exertions, as opposed to the oriental idea of a fate against which it is useless to struggle.

## *Common Expressions and Sayings*

17. Quote proverbs referring to : (a) The necessity of being honest. (b) The advisability of doing a thing now. (c) The wisdom of taking precautions.

(a) "Honesty is the best policy." (b) "Never put off till to-morrow what you can do to-day," or "Do it now." (c) "Prevention is better than cure," or "Look before you leap."

18. What is meant by : (a) "Terra firma" ? (b) "Sub rosa" ? (c) "Sine qua non." (d) "Vice versa" ?

(a) Solid earth ; a firm footing. (b) Under the rose ; quietly and without any one knowing. (c) As an understood thing ; an indispensable condition. (d) The opposite way about.

19. "People in glass houses shouldn't throw stones" and "As mad as a hatter" were expressions used in a speech made by a market-place orator. What did he mean ?

The first expression means that those who have faults or failings of their own should refrain from attacking the same faults and failings in other people.

"As mad as a hatter," should be "as mad as an attar." "Atter" is a corruption of "adder."

20. By whom were the following words used : (a) "I shall only pass this way once." (b) "Neither a borrower nor a lender be." (c) "Passing rich on forty pounds a year."

(a) Thos. Carlyle. (b) Shakespeare in "Hamlet"—Polonius' advice to his son Laertes. (c) Oliver Goldsmith in "The Deserted Village," in reference to the earnings of a parson.

## XXXVII.—RACES, PEOPLES, &c.

✓ 1. Which part of the world is supposed to have been the "cradle of mankind" ?

From human remains which have been discovered, it is almost certain that the cradle of mankind lay in the south-east of Asia.

2. Which are the five divisions into which mankind is usually divided, and to which of these races do we belong ?

The five races, arranged according to complexion and feature, are : (a) The Caucasian or white race. (b) The Mongolian or yellow race. (c) The Negro or black race. (d) The Malay or tawny race. (e) The Indian or copper-coloured race. Frequently a threefold classification is now made, viz., white, yellow, and black. The British belong to the Caucasian race.

3. Into what zones or belts is the earth usually divided ? Which of these are inhabited by the more energetic races of mankind ?

Five zones : North Frigid, North Temperate, Torrid, South Temperate, South Frigid.

In the North Temperate Zone practically all the leading nations of the world are found. The climate is such that it enables those living there to put forth their best physical and mental efforts, and they have no difficulty in outstripping those who live in climes where physical exertion or mental effort is a burden.

✓ 4. Why is the Nile valley the seat of an ancient civilisation, whilst the Amazon valley is yet in many parts practically uninhabited by human beings ?

The Valley of the Nile lent itself to settlement. There was alluvial soil. There were no great natural difficulties



## *Dogged British—Colonisers*

to be overcome, and it was near to the then-known centres of trade and population. The Amazon valley presents almost insuperable difficulties to the settler, owing to the exuberant vegetation which forms an almost impenetrable barrier to the pioneer.

5. What is it that has made the British nation so characteristically dogged and daring ?

Being a seafaring people they have constantly had to face dangers and difficulties. This has made them self-reliant and persevering.

6. Why are mountain dwellers generally hardier, more tenacious, and more likely to overcome obstacles than those living in towns or on plains ?

Mountain dwellers are constantly struggling against adverse circumstances—poor soil, severe climate, difficulties of transport—and must constantly put forth their best efforts. This makes for strength and endurance.

7. How do you explain the fact that man has been able to penetrate into every region of the world and settle there ?

Man is the most adaptable of all living creatures. He can make himself suitable clothing, construct necessary dwellings, fit himself with weapons of defence, and make use of an almost endless variety of food.

8. What leading motives throughout past ages have impelled men to leave home and found colonies ?

These comprise (a) Love of enterprise. (b) Desire for wealth or fame. (c) Because of social or political discontent. (d) Because of religious persecution.

## *Turkey—Races of Mankind*

9. What are the main characteristics of successful colonizers ?

(a) Enterprise. (b) Business capacity. (c) Friendliness.  
(d) Executive ability. (e) Versatility. (f) Adaptability.

10. What does the expression "The sick man of Europe" refer to ?

This is an epithet which is applied to either Turkey or the Turkish Empire. It is used because she is constantly in trouble of either a financial or political nature.

11. Who are the Pygmies ?

The Pygmies are a dwarf race inhabiting the forests of Central Africa. They are also called "Negritoes" or "Little Negroes," and are not only dwarf in stature, but degraded in habits and intelligence.

12. What do you know of (a) Bushmen or "black-fellows" ? (b) Maoris ?

(a) The Bushmen or "black fellows" of Australia are perhaps the most degraded type of manhood in existence.  
(b) The Maoris are the aborigines of New Zealand. Years ago they were fierce and warlike savages, but they have now settled down to peaceful pursuits. Intellectually they are the finest of the black races. They send representatives to the New Zealand Parliament.

13. What are the main characteristics of the Yellow races of mankind ?

The colour of the skin varies from clear yellow to coppery brown ; they have lank, straight black hair, narrow slit-like eyes, slanting foreheads, and high cheek-bones. They are more intellectual than the members of the black races.

## *Races of Mankind—Mohammed*

**14. Which race of mankind is at present supreme amongst men ?**

The white race has reached the highest degree of culture, refinement, and achievement. White men are found as leaders and rulers in almost every part of the world. The Japanese have acquired Western culture.

**15. Name two men who lived in early times, and whose religions are held in veneration by millions of followers to this very day.**

(a) Mohammed was born at Mecca at the end of the sixth century (570) and was the founder of the Mohammedan religion. This religion prevails in Turkey, Northern Africa, and Western Asia. They are often called Moslems or Mussulmans. The Mohammedan scriptures are called the Koran. Mohammed died in 632 A.D.

(b) Buddha, who died in the year 543 B.C., was a great philosopher. Buddhism is the prevailing religion in China, Japan, Burmah, Ceylon, etc.

**16. Who are : (a) Fireworshippers ? (b) Singhalese ? (c) Polynesians ?**

(a) In olden times the Persians were "fire-worshippers," but the Mohammedans crushed the rite. A few of the old believers escaped and fled to India, where their descendants to this day are called "Parsees" or "Fire-worshippers." (b) The Singhalese are the native inhabitants of Ceylon. (c) The Polynesians are the natives of Polynesia, the name given to the islands in the South Pacific. They are fast dying out.

**17. What is meant by : (a) "The White Man's Grave" ? (b) Man-power ?**

(a) Sierra Leone is called the "The White Man's Grave." The climate usually proves fatal to white men.

## *Russians—Dutch—Europeans*

staying there for any length of time. (b) Man-power means the number of men who can be mobilized by a nation for military purposes.

**18. Explain how it is that the Russian race lacks cohesive power.**

Owing to the vastness of the country and the lack of good roads and railway facilities, various parts of the country are isolated from one another. It is only in winter, when the roads become sledge tracks, that communication is easy. Hence the lack of the sense of unity, which is so strong among the smaller nations of Europe.

**19. Why is it that the Dutchmen of Holland differ so remarkably in temperament from the Dutchmen of South Africa ?**

Climate and environment are responsible for the difference. In their native country the Dutch are engaged in a long struggle against the inroads of the sea. This has made them dogged, daring, and resourceful. In South Africa no such struggle is necessary, and the result is that the Dutch do not display that unbounded energy which we associate with the Dutch of Holland. Neither are they so considerate and kindly as the people of Holland, because opportunities for securing cheap labour have made them less inclined to defer to others.

**20. What great differences are noticed between men living in the north of Europe and men living in the South of Europe ?**

In the north of Europe the inhabitants are steady, stolid, hard-headed. Those of the south are more mercurial, quick-tempered, vivacious, very hospitable, easily roused, and on the whole light-hearted.

## XXXVIII.—THE RAILWAY.

### 1. Why are small spaces left between the ends of railway metals ?

Spaces about  $\frac{1}{4}$  inch in length are left between the ends of railway rails to allow for expansion due to heat. During hot weather the rails expand until they practically touch. In very hot weather pieces are cut off the ends of some of the rails. It is quite a common occurrence to hear sharp cracking sounds when the lines contract during the cool of the night.

### 2. What is the permanent way ?

The permanent way is the name given to the track over which railway lines are laid. It is generally composed of gravel, and has a depth of about 12 inches.

### 3. Name any reasons why railway engines whistle ?

(a) To warn men working on the line. (b) To signal the proximity of a tunnel. (c) To announce that a train is resuming its journey after halting in a station. (d) To draw the attention of the signalman to the fact that the signal is against the train. (e) To signify that the engine is in need of repair, etc. Such a message is given to a signalman who telegraphs to the nearest large station, so that everything will be in readiness when the train arrives there.

### 4. What is a light railway ?

A light railway is a narrow-gauge railway. The gauge is usually about 2 feet 6 inches, instead of the standard 4 feet 8 $\frac{1}{2}$  inches gauge. Such railways are controlled by the Board of Trade. Restrictions on the laying down and working of light railways are not so severe as in the case of ordinary railways, chiefly because the speed limit does not exceed twenty-five miles per hour.

## *Railway Waggon—Turntables*

5. How is it possible to ascertain whether railway waggons are loaded to the correct height ?

In every siding there is an erection from which is suspended a circular-shaped arc of iron. This arc is so placed that, if a loaded waggon can pass beneath it without touching it, the waggon and its load will clear all bridges and tunnels met with on the railway.

6. What are turntables, and where are they generally found ?

These are appliances which are controlled by hand, and are used to turn an engine completely round. Turntables are generally found at terminal stations, so that an engine which has arrived with a train may be turned round to face in the direction for taking the train out again.

7. How do express trains secure a water supply for the engines when going on long non-stop runs ?

Main lines are in many instances provided with long troughs between the rails. These are kept filled with water. When the engine arrives at one of these troughs the driver lowers a scoop into the water. This scoop is connected by a pipe to the tender. The rapid motion of the train causes the scoop to force the water up the pipe. This is done as the train proceeds.

8. When a railway is contemplated in a district which is being newly opened up, what points must be borne in mind by the engineers ?

(a) Steep gradients must be avoided as far as possible. (b) The route must be as direct as possible. (c) The character of the soil must be taken into consideration—thorough drainage must be possible. (d) The nature of the soil must be considered—cutting embankments and tunnels through thick layers of rock is expensive and

## *Railway Carriage of Goods*

difficult. (e) Crossing main roads must be avoided as far as possible.

**9. Why do railway companies find it necessary at times to refuse the carriage of very heavy goods ?**

It is very rarely indeed that this happens. It is often due to the fact that the article in question cannot be taken to pieces and in consequence would fail to clear the bridges, etc. There is also the question of weight to be considered in such a case. Damage to the permanent way may result if the tonnage is excessive. It has been found necessary at times, when large cathedral bells are to be repaired, to convey them by road to the factory.

**10. When a railway line is blocked by accident, one track only being affected, how is traffic carried on while it is being cleared ?**

A single line system is brought into use. This, of course, results in a slight curtailment of traffic.

**11. What is the Railway Clearing House ?**

By means of the Clearing House it is possible for goods and passengers to follow an uninterrupted journey, although in the course of it the lines of several companies may be used. An account is issued each month by the Clearing House to each railway company, showing the amount owing by that company to the other companies, and also the receipts due to it from the other companies.

**12. Why is it dangerous to open a railway carriage door before the train stops at the platform ?**

Officials and passengers on the platform may be struck by the carriage door as it sways backwards and forwards owing to the motion of the train. The door may also strike luggage resting on the platform.

## *Estimating Speed of Train—Sidings*

**13. In what way can a passenger estimate the speed of a train in which he is travelling ?**

The telegraph poles on a railway are  $\frac{1}{4}$  mile apart. Ascertain the number of seconds it takes the train to pass from one pole to the next. Divide the number of seconds into 900. The answer will give the number of miles per hour travelled, *e.g.*, If it takes 20 seconds,

$$\bullet \text{ Miles per hour at which train is travelling} = \frac{900}{20} = 45.$$

**14. A person rushes to catch a train and finds that he has no time to get a ticket. What should he do under the circumstances ?**

If he wishes to travel by the train he should mention the matter to the guard of the train at the first opportunity, so that when he alights there will be no question as to the distance he has travelled and the fare he has to pay. In some cases it is possible to secure a ticket from an official who carries vouchers with him for this purpose.

**15. What are sidings, and what do you know of their length ?**

A siding consists of lines parallel to the main line, and connected with it. They are used for shunting, and greatly assist in keeping the main line free from obstructions, which would waste time and cause accidents. Their lengths are determined by those of the longest trains. They must be of sufficient length to allow any train to emerge from one siding, and shunt back into another without coming on to the main line.

**16. What effect has dampness on railway lines ?**

When the rails are dry an engine driver is able to pull up his train far more quickly than when the metals are



## *Illness in Train—Funnels—Engines*

“greasy.” When the rails are wet the wheels fail to secure so effective a grip as when they are dry.

**17. How can it be ascertained without asking any question whether railway lines are in fairly frequent use ?**

This can be ascertained by the brightness or dullness of the metals. On Sundays for example, when traffic is considerably reduced, the lines become dull. If left unused for some time they become coated with rust.

**18. A person is taken suddenly ill in the train. What would you do ?**

In the case of a stopping train it is better not to pull the communication cord, but to wait until the next station is reached. In an express train which is not due to stop for a considerable time, it may be necessary to pull the cord, but only in the gravest emergency.

**19. Many modern railway engines have surprisingly short funnels. How is this ?**

Many modern railway engines would fail to clear the tunnels otherwise. When tunnels were first cut, the engineers did not anticipate the rapid advance which would be made in the construction and size of railway locomotives.

**20. Why is it impossible at present to materially increase the size of railway engines ?**

All ordinary railways have a gauge of 4 feet 8½ inches, hence if the size of engines and rolling stock were materially increased, it would be essential to extend the gauge of the lines proportionally. This would result in enormous expense and inconvenience.

## XXXIX.—THE SEA.

### 1. Who controls the lighthouses of the British Isles ?

The "Trinity House" authorities have the general control over lighthouses in England, Wales, the Channel Islands, and adjacent seas and islands. They are also responsible for rules and regulations in regard to pilotage. Trinity House has stations at most ports. The "Elder Brethren" of Trinity House assist the judges of the Admiralty Division, and help to settle disputes about shipping.

### 2. How is it that lighthouses are built in the form of circular pillars ?

They are built in this form to withstand winds and storms. The idea is thought to have been inspired by the shape of the trunk of the oak, which resists the force of the gale far more effectively than if it were square in shape.

### 3. Why is oil generally used as an illuminant in the lamps of lighthouses ?

(a) It gives a steady and penetrating light. (b) It is completely under the control of the lighthouse keeper. There is no danger of it being suddenly cut off as sometimes happens with electric light and acetylene gas. (c) It is clean to use.

### 4. What is a "tramp steamer" ?

The term is used to describe vessels which do not ply between fixed ports. They wander from one port to another taking cargoes here and there, often remaining away from their own country for months and years at a time.

## *Salt Water—Fish—Crossing the Line*

✓ 5. Why does the water in the Mediterranean Sea contain more salt than that of the Baltic Sea?

In the Mediterranean more water evaporates than is brought in by rivers. Hence there is a current inward through the Strait of Gibraltar. This current brings in dissolved salt. In the Baltic more water is brought in by the rivers than evaporates. Hence there is an outward current carrying salt from the Baltic.

6. We often hear of ships and armies in time of war putting up a "smoke screen." What creature of the sea suggested this idea?

The cuttle-fish is provided with a bag which stores up an inky fluid. When in danger of attack it squirts this out, thus sheltering itself. This fluid is used in making the pigment sepia largely used by water-colour artists.

✓ 7. Would you describe a whale as a fish? If not, state your reasons.

The whale is not a fish. A fish is a cold-blooded creature, breathes by means of gills, and lays eggs from which its young are hatched.

A whale is a warm-blooded animal, and breathes by means of lungs—consequently it has to come to the surface of the water to breathe. In addition it is a mammal, that is it suckles its young.

8. What do sailors mean when they talk of "crossing the line"?

The "line" is the equator. When crossing the equator it is customary to have boisterous fun—the victims being those who are making their first acquaintance with equatorial regions. The sailors duck those of their comrades who have not previously experienced this time-honoured custom.

## *Boat Marks—"Blue Peter"*

9. Some coasting boats bear the marks GY 17, YH 114, LL 65, and FD 6. What do these signify ?

These are registration marks. The letters are the first and last letters of the name of the port of registration. The number is the registered number. GY 17 indicates that the craft is registered at Grimsby, YH 114 at Yarmouth, LL 65 at Liverpool, FD 6 at Fleetwood.

10. A ship is lying on the quay side and is about to sail. How can a person ascertain this without asking any question ?

When the ship is about to sail a small flag called the "Blue Peter" is hoisted prominently. It is a square flag with a white rectangular centre and a blue border.

11. A ship lies at anchor in a tidal river. It is noticed it faces up-stream during one part of the day, and down-stream at another. Explain this movement.

A ship lying at anchor in a tidal river always turns completely round when the tide changes. It is carried round because one end—the bow—is fixed by the anchor.

12. What is meant by the term "white horses" in connexion with the sea ?

"White horses" is a poetical name for breakers, because of a resemblance to charging horses.

13. Why do fishes in the open sea generally deposit their eggs on the surface of the water, and those near the coast or in rivers deposit them at the bottom of the water ?

Fishes which live in the open sea deposit their eggs on the surface of the water. There they are hatched by the heat of the sun. At the bottom of the sea it would be too cold for them. Those which live in shallow waters

## *Air in Water—"Three-Mile Limit"*

deposit their eggs at the bottom, and there they hatch out as the sun's heat can penetrate to such a small depth. On the surface they would be exposed to numerous enemies. In the open sea, eggs which float on the surface are comparatively safe as there are few enemies.

**14. A fish is kept in water in a globe, the water having previously been boiled. What will be the result ?**

When water is boiled dissolved air is driven out. A fish placed in this water would die because of the lack of air. The gills take in this dissolved air from ordinary water.

**15. What is meant by the "three-mile limit" ?**

The seas and oceans of the world are generally considered free and belonging equally to all, but for a distance of three miles from the shore (low-water mark being usually taken as the line from which the measurement is made) a maritime country exercises certain well-defined rights and privileges. This strip of the sea is looked upon as belonging to the nation whose coast it washes.

**16. Which part of a fish acts as a propeller ?**

A fish propels itself through the water by means of its tail. Its fins merely help it to keep its balance. Fishermen often propel their boats used for landing with a single oar used in the way a fish uses its tail.

**17. Why do some lighthouses have revolving lights ?**

This practice is becoming quite general. It enables sailors to distinguish lighthouses from other lights. The light is so arranged that it is clearly visible for a short period, then it is cut off from view. This process is repeated regularly, and each lighthouse has its own rate

## *Customs House—Pilots—Freedom of Seas*

of revolution. Hence sailors are able to tell one light-house from another by observing the light.

**18. What is a Customs House, and where is it generally situated ?**

A Customs House is a place where duties to be paid on goods imported and exported are received. In all large ports a Customs House is found.

**19. When a boat reaches the mouth of an important estuary, what steps are taken to ensure that it shall follow a safe course ?**

A pilot is taken on board, and he is responsible for the safe navigation of the steamer. Pilots are attached to particular rivers, roads, important canals connected with main waterways—such as the Manchester Ship Canal—and channels. Their work as a rule is under the control of Trinity House.

**20. What is meant by “ The freedom of the seas ” ?**

“ The freedom of the seas ” is an expression which has come into general use during the war. The idea is that the seas should be open for general traffic in time of war as well as in time of peace. This would mean that belligerents must give up the right of capture at sea, a right which the British Navy used effectively against Napoleon and against the Germans.

## XL.—SHOPPING.

1. What are the advantages of weekly or monthly payments of accounts ?

Much unnecessary keeping of accounts is avoided, one bill only has to be settled, mistakes are less likely to arise owing to people finding themselves without the proper change, and deliveries can be effected without the purchaser having to wait till the order is made up in order to pay.

2. In order that a bill which has already been paid should not again be presented, what precautions should be taken ?

Every bill should be receipted and filed for reference. It can then be produced if required.

3. What are "multiple shops" ?

This term is applied to those businesses which have many branches in various parts of a town or in different towns.

4. What recent innovation has given rise to much concern amongst shopkeepers selling penny articles such as boxes of matches, chocolate, sweetmeats, etc. ?

The "penny-in-the-slot" machine has injured the trade of small shopkeepers. It is readily accessible, rarely out of order, and provides a ready means of purchase.

5. What provisions are made to provide against lady shop assistants suffering from undue fatigue ?

Under the provisions of an Act of Parliament, in all shops where goods are sold by women, the employer

## *Business Management*

must provide at least one seat for every three assistants, in order that when not serving customers they may take necessary rest.

6. In large places of business what arrangements are made to enable business to be carried on smoothly during meal times ?

In large business establishments food is provided on the premises for the assistants. One group of assistants takes a meal whilst the others run the business.

7. In large business establishments having many exits, what precautions are taken to prevent purchasers leaving the stores without paying for purchases ?

After a customer has made a purchase she receives a ticket showing the amount of that purchase. This is presented at the nearest cash desk ; payment is made, and the account settled. The receipt is then returned to the assistant who sold the goods, and it is exchanged for the goods purchased.

8. What is meant by a " one-man business " ?

This expression refers to a business which is under the control of one person. It is usually managed by himself or herself with assistance from members of the family.

9. How are food supplies controlled and distributed in time of war ?

In time of war when food supplies are restricted, a scheme of rationing has to be adopted, to ensure that rich and poor alike shall receive a fair share of the supplies available. The amounts of various foods per head are fixed with due allowance made in special circumstances. Shopkeepers " claim " supplies according to the number of their customers, and detailed records are kept in all cases



## ***“Shop-walkers” — Customers’ Change***

**10. A person enters a large stores. How can she ascertain where she can purchase the goods she requires ?**

All large stores employ men whose business it is to answer enquiries, and direct purchasers to the department of which they are in search. These men are called “shop-walkers,” from the nature of their work.

**11. What system is adopted in many business establishments of relieving assistants of any concern in regard to customers’ change, etc. ?**

An arrangement is adopted whereby the money tendered by any customer is enclosed along with the bill in a small hollow case. This is sent by means of overhead wires to the cashier’s desk. The cashier returns the change when such is required.

**12. In small places of business what practice is being adopted to allow shopkeepers to have meals in comfort ?**

It is becoming the general practice to close small shops during the luncheon hour.

**13. What is an invoice ?**

An invoice is a statement of the prices, quantity, and description of goods despatched. Should there be any discrepancy between this statement and the goods received, notification should be immediately sent to the firm forwarding the goods.

**14. Many places of business are anxious to adopt improvements. What inducements are offered to the employees to suggest improvements ?**

Many enterprising business establishments have a “suggestions bureau.” Employees are invited to offer any suggestion which they think would result in improving the business. Should such suggestions prove practicable, substantial prizes are awarded.

## *Trade Samples—"Shop-soil"—Receipts*

**15. A firm decides to place on the market a new article of food. How do they bring it most effectively before the notice of likely purchasers ?**

Arrangements are made as a rule for "tasting" samples to be distributed. Where possible, these are sent through the post or distributed by shopkeepers. Frequently arrangements are made to enable samples to be tasted in the shops, soups, etc., being made by representatives of the firm introducing the article of diet.

**16. What is meant by a "shop-soiled" article ?**

This refers to an article which has been exposed to the effects of the weather or to the examination of customers, and has thereby lost its original freshness.

**17. A person is paid a bill for £2 or over. What must he do ?**

The receipt must be stamped with a penny stamp across which is written the name of the receiver. Otherwise the receipt is not legal.

**18. A woman purchases tinned foods. What should she always do after opening the tin ?**

All tinned foods after being opened should be immediately emptied into a proper receptacle. The contact of the air with the tin and the food may result in chemical changes. Poisonous matter may be produced.

**19. The following notice appeared in a business establishment : " We have a ' To be called for Department.' " What did it mean ?**

This meant that persons could hand in a list of articles which they wished to buy with the intimation that they would call for them at a certain time. This practice saves much time in waiting for orders to be made up.

## *Punctuality—the Soul of Business*

**20. What is meant by the saying “ Punctuality is the soul of business ” ?**

Punctuality is the life of business, as the soul is of the body. Without punctuality a business rapidly declines, as unpunctuality breeds lack of confidence and consequent failure.

## XLI.—SIMPLE SURVEYING, MEASURING, &c.

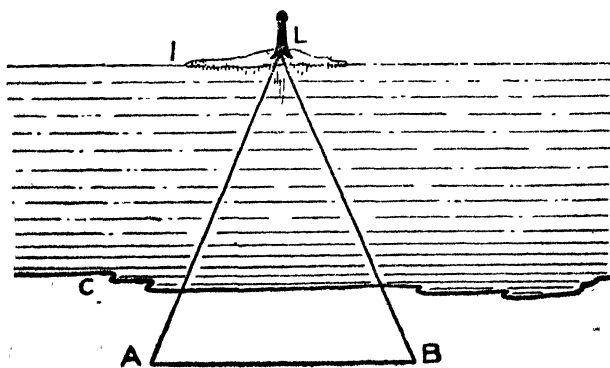
### 1. What is meant by a base line, in surveying ?

A base line is a very carefully and accurately measured line which is used as the starting-point in surveying.

### 2. In making a simple survey of a district a system of triangulation is used. Explain what is meant by this.

A base line is fixed upon and most carefully measured. A prominent point is fixed on at some distance from the base line. A theodolite is placed at one end of the base line and the angle between the base line and a line to the point is measured. The operation is repeated at the other end of the base line. The length of the two sides of the triangle (*i.e.*, the distance of the point from each end of the base line) can now be calculated. Either of these distances may now be used as a base line for further calculations. The whole district to be surveyed is covered with triangles in this way.

### 3. A person standing by the seashore wishes to determine the distance between himself and a lighthouse situated on an island at a short distance from the shore. Show how it can be done.



## *Simple Measurements—Gunter's Chain*

Let I represent the island, and the dark point in the centre the lighthouse ; C is the coast A base line A B is measured, and the angles at A and B are measured by means of plane-table or theodolite. The whole is then drawn to scale, and the distances A L and B L are readily found.

**4. Name some parts of the body and simple objects which are of use when making rough measurements.**

The nail joint of forefinger, or breadth of thumb, is about an inch. The distance between the wrist and the elbow is about 10 inches. The span of thumb and forefinger is about 8 inches. The distance from elbow to tip of forefinger is about 17 inches. This distance is called a cubit. The distance from the tip of the nose to the end of the forefinger with arm outstretched is a yard. This measurement is often used when estimating the length of calico, etc., the mouth being used instead of the nose as starting point. An ordinary pace is  $2\frac{1}{2}$  feet. A halfpenny measures exactly an inch across.

**5. What is a "Gunter's Chain" ?**

"Gunter's chain" is a chain 66 feet long, containing 100 links, and is divided into ten parts by small toothed tallies. At 10 links from either end a tally with one tooth is fixed, at 20 links one with two teeth, at 30 links one with three teeth, at 40 links one with four teeth, and midway a large pear-shaped tally is fixed.

**6. In measuring large fields what method is followed in using a Gunter's Chain ?**

Two men are employed, and in addition to the chain ten arrows are used. The first man starts off across the field to be measured, with the ten arrows and the handle at one end of the chain in his hands. His assistant firmly fixes his end of the chain in the ground. When the chain becomes taut the leading man fixes an arrow in the

## *Measuring Field*

ground at the spot. He then walks on in the same straight line. His assistant comes up to the spot where the first arrow rested. When the chain has again become taut and a second arrow firmly fixed in the ground by the leader the assistant takes out the first arrow. This continues until the distance across the field has been measured. The arrows are checked to see that no mistake has been made.

**7. An irregular-shaped field is to be measured. What system is usually followed ?**

An irregular-shaped field is divided as far as possible into triangles. These triangles are then measured by the triangulation method, and the field is mapped out.

**8. A surveyor makes the following entry in his field book :**

	to B	
	160	
to D48	144	
	112	to C <sub>1</sub> 80
	64	to C 64
	From A	

Draw a diagram showing the plot represented by the entry.

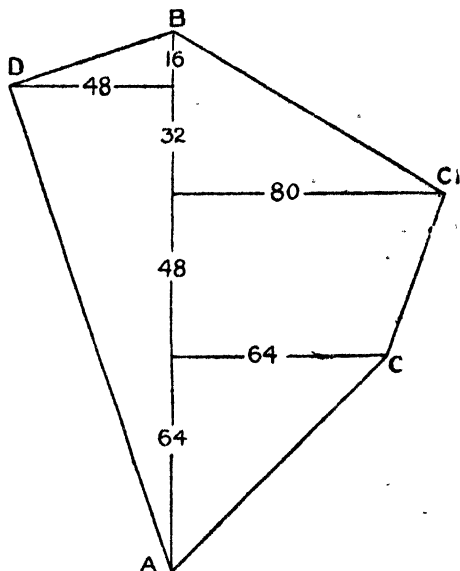
The diagram on page 208 shows plot measured. The figures on the right are the lengths from the diagonal to the boundary on the right. The measurement on the left gives similar measurements on the left. The entries in the centre column are the measurements of the various parts of the diagonal.

**9. A man walking through some fields has a walking-stick and a tape measure. If the sun were shining, how could he find the height of a tree ?**

Fix the walking-stick upright and measure the part above ground. Then measure the length of the shadow cast by the walking-stick, and the length of the shadow cast by the tree. The height of the tree is in the same

## Surveyor's Notes

proportion to its shadow as the height of the stick to its shadow.



10. A boy wishes to know the height of a factory chimney. How can he find it?

He will first measure a base line  $AB$  in line with the chimney. Next he will measure the angles  $XBD$  and  $XAD$  from each end of the base line  $AB$ . Using a suitable scale he will draw the base line and the lines  $AX$ ,  $BX$ .  $XD$  can then be measured. (*See p. 209.*)

11. An irregular-shaped lake is to be measured to see the area it covers, but it is to be done without any measurement being made on the surface of the water. How would a surveyor proceed?

Suppose the lake be of the shape represented by

## *Finding Height of Distant Objects*

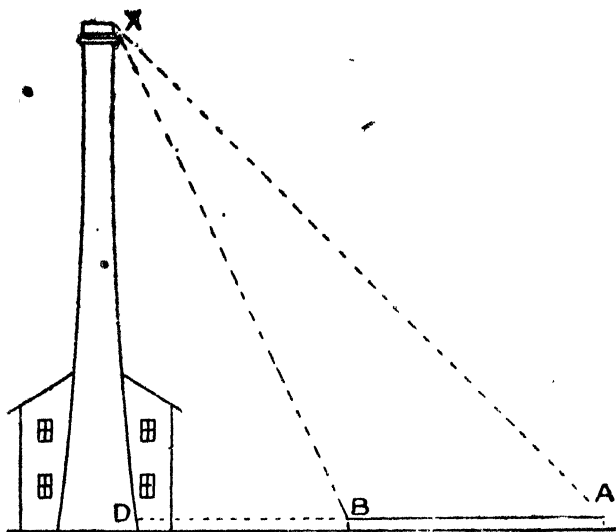
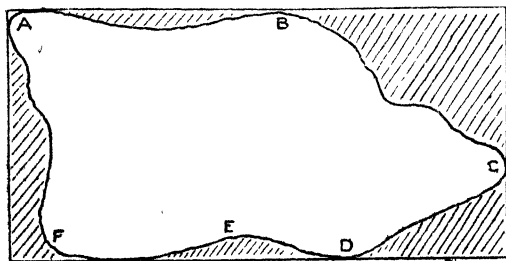


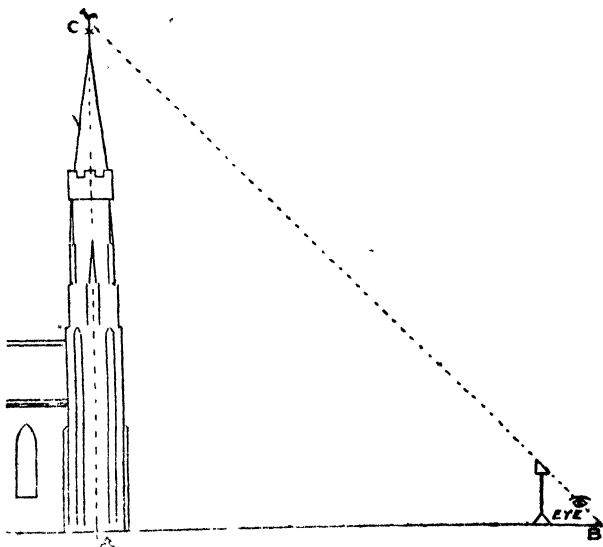
figure A B C D E F. Then a regular figure is circumscribed in the manner indicated. The area of this complete figure is found, and the areas of the shaded portions found, and taken from the whole. The remainder will represent the area of the lake.





## *Finding Height of Distant Objects*

12. It is desired to find the height of a certain church steeple. What is the simplest way of finding it?

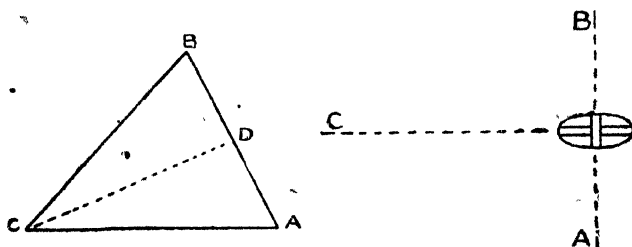


Take a set-square with angles of  $90^\circ$  and  $45^\circ$ , and move backwards from the church until the top of the steeple is in the same straight line as the hypotenuse of the set-square (this should be mounted on a support and held erect). The eye looks along the longest side of the set-square. The height of the steeple will be the same as the distance between the observer and the foot of the steeple. That is,  $AC$  will equal  $AB$ . It will be seen that a right-angled triangle has been formed with base and perpendicular height equal.

13. In the measurement of fields it is frequently necessary to measure perpendicularly distances in finding areas of triangles, etc. What instrument is used for this?

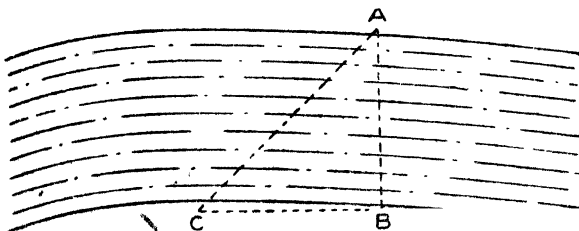
## Measuring Field—Distance Across River

A spiked staff with a flat top on which are cut two grooves crossing each other at right angles. It is 5 to 6 feet high, and is manipulated as follows: Suppose a surveyor wishes to find the distance from C to A B.



He puts down the pole or "offset-staff" and finds the exact spot where he can see A and B along one of the grooves, and without moving he can see point C along the other groove. The offset-staff is then fixed at the point D and C D can be measured.

14. What is the easiest method of calculating the distance across a river?



Choose a mark A and set up a stick B facing it on this side of the river. Take a set-square with angles of  $90^\circ$  and  $45^\circ$  and walk along the bank at right angles to A B looking along the hypotenuse of the set-square,

## Spirit Level—Clinometer

until the mark A is in the same straight line. When this occurs C will have been reached. The length from B to C is the same as the width of the river.

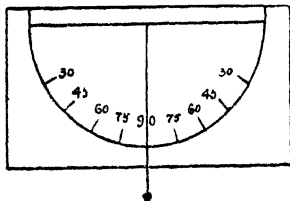
### 15. What is a spirit level?

A spirit level is an instrument for determining whether a surface is horizontal. It usually contains a tube nearly full of alcohol or ether. In this there is an air bubble which rests in the centre of the glass tube when it is horizontal.

### 16. What is meant by (a) A station? (b) A clinometer?

(a) A station is a point from which a line or an angle is measured. It is denoted in survey records thus:  $\Delta$

(b) A clinometer is an instrument which is used for finding angular measurements such as the slope of a hillside or an embankment. It consists of a semicircular arc or scale graduated and mounted. A pendulum indicates the angle to be measured. As the apparatus is turned to measure the angle, the pendulum remains vertical.



### 17. What is a cyclometer?

A cyclometer is an instrument which is used to measure the distance travelled by a bicycle. An ordinary bicycle wheel is 28 inches in diameter, hence at each revolution it turns  $28 \times \frac{22}{7}$  inches = 88 inches. Therefore it revolves 720 times in going a mile. The cyclometer is attached to the front axle of a bicycle wheel. It records every revolution of the wheel. The reading 123<sup>4</sup> on the cyclometer indicates 123<sup>4</sup> miles.

### 18. The following marks are noticed on an ordnance

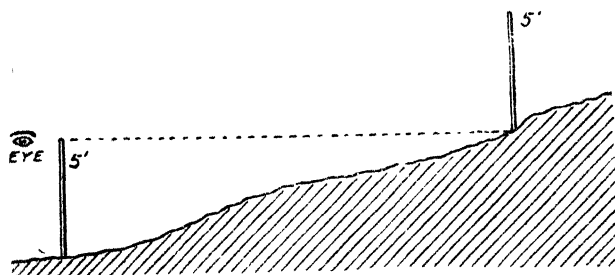
## Ordnance Map—Hill Slope

survey map : L.B., S.B., S.V.,  $\leftarrow$ , W.,  $\blacksquare$ . What do they indicate ?

L.B. = Letter box. S.B. = Signal box. S.V. = Sewer ventilator.  $\leftarrow$  = Direction of running water. W. = well.  $\blacksquare$  = Church or chapel with tower.

19. In what simple way is the slope of a hill measured ?

Take two poles, say, 5 feet each in height. Set up the first at the foot of the hill, and carry the next up the slope until the top of the first pole is in an exact line with the bottom of the second pole held upright—thus :



From the first to the second pole the hill rises 5 feet.

20. The following board is seen on the side of the railway : 25M 14C. What does it mean ?

This indicates that the spot so marked is 25 miles 14 chains from the nearest great railway centre. Distances on the railway are measured by means of the Gunter's chain.

## XLII.—THE STREET.

1. Name some of the oldest roads in the country, and say where they are to be found.

The chief are (a) Watling Street, running from Kent to Chester and York, and northwards in branches to Carlisle and the neighbourhood of Newcastle. (b) Irmin Street, from London to Lincoln and York with a branch to "Wall's End." (c) Ikenild Street, running along the East Coast. It strikes inland at Norwich, and passes through Newmarket, Dunstable, and Winchester to Southampton. (d) The Foss Way runs from the coast of Devonshire to the coast of Lincolnshire.

2. A board placed at the end of a street bears the words "Mansfield St., Unadopted." What does this signify?

This wording indicates the name of the street, and also that the local council have not carried out scheme of adoption, leaving all repairs to roads, laying of pavement, etc., to be carried out by the owners of the houses.

3. What does a red lamp over a gateway usually signify? One or more red lamps resting in the roadway at night? An enamelled panel on which a blue bell is shown?

(a) This generally indicates the residence of a doctor. (b) These are to warn people that road repairs are in hand, and that they must proceed with caution. (c) This sign indicates a public telephone. The sign is that of the National Telephone Company which is now under Government control.

## *Street Dangers—Hints for Cyclists*

**4. Name any dangerous practices often followed by people when in the street.**

(a) They step off the pavement with their backs to approaching traffic. (b) They attempt to board and alight from buses, tramcars, etc., when these are in motion. (c) They emerge from behind stationary vehicles without first ascertaining if there is any traffic coming in the opposite direction. (d) Cyclists often hold on to motor lorries, waggons, etc., in order to be pulled along. (e) Some people continually step on and off the pavement—a most dangerous practice.

**5. What should a cyclist do when crossing tram lines? When riding on a greasy road? When a driver of a vehicle in front of him puts out his right hand?**

(a) He should cross them at as large an angle as possible to prevent being fouled. (b) He should keep his tyres well inflated to minimise the risk of skidding. (c) This is an indication that the driver is turning to the right. The cyclist should bear to the left or go straight ahead to prevent an accident.

**6. How can you ascertain without asking whether a taxi-cab is for hire?**

The indicator on the left of the driver bearing the words "For Hire," is erect when the vehicle is for hire. When engaged it is turned down.

**\*7. If you saw a child lost in the street, how could you help him?**

If the child does not know its name and address, take it to the nearest police station. The police will make enquiries and will take care of the child till it is claimed. As soon as children learn to speak they should be taught to repeat their name and full address.

## *Royal Arms—Foreign Flags*

8. A building bears the following inscription :—  
“MDCCCLV.” What does this indicate ?

M. represents 1,000. D = 500. CCC = 300. L = 50  
V = 5. MDCCCLV = 1855. The inscription most  
probably gives the year in which house was built.

9. In certain places representations of the Royal Arms  
are to be seen fixed to business establishments. What  
does this mean ?

This privilege is allowed to people who have been  
granted a warrant to supply goods to the King or the  
Queen.

10. A visitor to a town notices a flag of a foreign nation  
continually flying on a certain building. Explain the  
reason for this.

It would indicate that the consul of the country  
whose flag is flown was carrying on his duties in the  
building. Any of his countrymen visiting, or residing in,  
the town may consult him, if they require advice or  
assistance.

11. What is a (a) a promenade ? (b) an esplanade ?

(a) A promenade is a walk used for pleasure, show, or  
exercise. We generally use the name for the chief  
pleasure walk of a seaside resort. (b) An esplanade is a  
level walk used for either driving or walking. It was  
originally a level space between a citadel and the houses  
near it. The word is frequently used now to describe a  
walk laid out for pleasure, generally by a riverside.

12. A section of a certain street is seen to be tem-  
porarily covered with oak bark. Why is this ?

This precaution is taken to deaden the sound caused  
by passing traffic when a person in an adjoining house

## *Road Congestion—R.S.P.C.A.*

is dangerously ill. It was more necessary years ago than it is now because many vehicles have rubber tyres instead of the old iron bands.

**13. A road connecting two towns becomes congested with traffic. How can this congestion be remedied ?**

The only obvious means is to divert some of the traffic to another route. If an alternative route does not exist it may be necessary to make a new road. In populous parts of England this has often been done in spite of the heavy expense.

**14. If you saw a person ill-treating an animal attached to a vehicle, what steps would you take to bring him to justice ?**

The attention of the police should be drawn to the person. If this is not possible, the name and address of the person owning the vehicle should be noted. The name and description of the owner can generally be found on the vehicle. This information should be forwarded to the nearest office of the Royal Society for the Prevention of Cruelty to Animals together with an account of the occurrence—date, time, nature of cruelty, etc.

**15. What famous street in London is inhabited chiefly by doctors ?**

Harley Street, London, is famed for its specialists. In most cities and towns the leading medical men reside in the same street or area. Rodney Street, Liverpool, is another example of this custom.

**16. A gentleman accompanies a lady down the street. On which side would he walk, and why ?**

A gentleman when walking with a lady, unless requested otherwise, walks on the side adjacent to the



## *Street Mirrors—Jewellers' Shutters*

kerb. This prevents the lady having to step off the pavement—a dangerous practice in a busy thoroughfare—when the streets are crowded. The lady can also secure a better view of the shop windows.

17. A large mirror is sometimes noticed at the corner of a street. Why is it placed there ?

It is the custom in some localities to place a " traffic " mirror at a dangerous corner so that people approaching the mirror are able to see what is coming in the opposite direction.

18. In the shutters attached to jewellers' windows, circular holes are frequently cut. Why is this ?

This is done so that the policeman on his beat may be able to look in during the night to see if things are all right. A light is kept burning so that it is quite a simple matter for the police to make the investigation.

19. Where do you see the following warning, " It is dangerous to touch the wires " ?

This notice is generally found on bridges under which the wires of the overhead system of electric tramways run. In order to pass beneath the bridge the wires and trolley run at a lower level than usual, and hence such a warning is necessary.

20. In case of fire, how do the firemen know where to secure a supply of water ?

They locate the nearest fire hydrant sign which consists of a square panel affixed to a wall or fence and bearing the letters F.H., in white, with figures indicating the exact position of the hydrant.

## XLIII.—TIMBER, &c.

**1. How are trees classified according to the places where they grow ?**

•They are classified as forest trees, hedgerow trees, and riverside trees. Some trees prefer a moist situation, others a dry one ; some prefer the mountain side, whilst others thrive in the valley. When autumn comes and the seeds are dispersed, those come to perfection which find a resting place on suitable ground. The most familiar hedgerow trees are the ash and the elm. The oak and beech prefer the forest. Willows and poplars thrive best by the side of rivers or in damp ground.

**2. How is the pollen from the flowers of many forest trees distributed ? What provision makes this method of distribution effective ?**

Most forest trees depend upon the wind for the distribution of their pollen, as the flowers fail to attract the insects in any numbers. These trees blossom before the leaves appear so that the clouds of pollen from the tassels of flowers (or catkins) are not prevented by the leaves from coming into contact with the pistils of the female flowers.

The lime trees and willow trees are both visited by insects, which aid in pollination.

**3. What objections are there to planting ash trees on land used for agricultural purposes ?**

The roots of the ash tree draw nourishment from the surface soil, and thus rob the growing crops of food. If cows eat the leaves or young shoots of the ash, the butter has a rank taste and is rather unwholesome as a consequence.

**4. What is meant by (a) " trembling like an aspen leaf " ? (b) " Hearts of Oak " ?**

(a) The aspen is sometimes called the trembling

## *Acorn—Oak—Hard Woods*

poplar. It is a characteristic of all the poplars that the least breath of wind keeps the foliage in constant motion, the result being that the light underside of the leaf, and the darker side are alternately exposed to view. Hence a person who is trembling is said to be "trembling like an aspen leaf" (b) The war ships of Nelson's time were called "Hearts of Oak" because they were built of the heart wood or centre wood of the oak tree. This is the strongest and most durable part of the oak tree.

### **5. What is (a) an acorn ? (b) an oak apple ?**

(a) The acorn is the fruit of the oak tree. The word literally means "oak corn," probably deriving its name from the fact that in uncivilised times acorns were ground and used as food (b) The oak apple is a round, smooth swelling found on the leaf stalks and young shoots of the oak. It is formed by an insect called the gall-fly, which penetrates the stalk or twig and deposits its eggs in the hole thus formed. This sets up an irritation in the stem which is punctured causing it to swell into a round ball with the egg safely protected inside. The oak apple serves as a storehouse of food for the grub which will emerge from the egg.

### **6. Which English tree suggested the form in which lighthouses are now built ?**

The oak tree suggested to Smeaton, the builder of the present lighthouse at Eddystone, the form which the building should take. Knowing that this tree is able to withstand the storms of centuries, he came to the conclusion that the principle should be applied in the building of his lighthouse.

### **7. Why is the wood of some trees harder in texture than others ?**

The reason lies in the fact that hard-wooded trees take longer to mature. The oak which produces timber of very hard texture takes years to mature, whilst the

## *Timber and Wood—Oak, Pine, Fir*

poplar and willow, two soft-wooded trees, grow at a much more rapid rate.

### **8. What is the difference between timber and wood ?**

Timber is the wood of large trees which can be sawn up into thick planks. The chief timber trees are oak, ash, elm, beech, pine, and fir. The term "wood" is used for the medium used by joiners, cabinet-makers, toy makers, etc., and includes the growth of the walnut, holly, maple, and cherry trees.

### **9. Why are cricket bats, tool handles, etc., frequently made of willow ?**

The wood of the willow is light, tough, and elastic. It does not easily split when it receives a sudden blow. Hence it is used for making cricket bats, tool handles, small boats, etc., where such characteristics are specially valuable.

### **10. Why is the oak called, the "Monarch of the Forest" ?**

The oak is thus designated because its wood is superior to that of all other trees, being the strongest and most durable of all British timber. It is specially useful in shipbuilding, and for making the roofs of churches, houses, etc., or for any purpose where durability is the main object in view.

### **11. Why are the firs and pines of our forests particularly valuable ?**

These trees are especially valuable as they provide us with wood which is easily worked. From these trees masts, flag poles, telegraph poles, etc., are made, and they also supply resin, tar, turpentine, and pitch, which are obtained from the sap and roots.

### **12. What are "ornamental" woods ?**

Ornamental woods are those which are valuable because of the beauty of their grain, and because of the high polish which they are capable of taking. They are

## *The Elm—Age of Tree—Uses of Bark*

used chiefly by the cabinet maker, and include ebony, maple, walnut, rosewood, mahogany, and satin-wood.

**13. Which wood will last longer in water than almost any other wood in the forest ?**

The elm, which produces heavy cross-grained wood, is very tough and strong. It will last longer than almost any other wood when in contact with water. It is not satisfactory when subjected to frequent changes from wet to dry, and *vice versa*. It is not a good wood for exposure to the atmosphere in a wet climate. It is mainly used in the construction of dock-gates and piles. The bent parts are used in ship building. Occasionally it is used in the construction of water pipes.

**14. How can the age of a tree be determined ?**

The age of a tree can readily be determined by counting the rings found in a horizontal section of the tree. Each year a new layer of wood is added. Hence each ring represents a year's growth, and the age of the tree is thus recorded.

**15. How is it that the layers or rings of wood seen in a horizontal section of a tree, vary in thickness ?**

The layers of wood vary according to the kind of weather experienced. If a layer be narrow, this indicates that the weather during the year of its formation, was dry. A wet season results in a thick layer of wood being formed, as more sap rises in a wet summer than in a dry one.

**16. Name any uses to which the barks of trees are put ?**

The bark of a certain kind of oak tree grown in Spain is used for corks. The bark of the oak, chestnut, and other British trees, is largely used in the manufacture of leather. When ground and steeped in water, the bark forms a liquid called ooze, which is rich in tannin. This product is used in tanyards, and helps to convert the hides into real leather.

## *Section of Trunk—Deciduous Trees*

The bark of the cinchona tree is used in making quinine. .

The inner bark of some trees, of which the lime is typical, is made into bass or bast which is used by the gardener for tying plants. Bass is also used for making matting which is used in packing furniture, pictures, etc.

**17. What use are the lines which radiate from the centre of a tree to the bark ?**

They are formed by thin layers which run longitudinally along the stem, and serve as channels up which the sap passes to the leaves, in order that it may be prepared to take its part in the development of the tree. These rays are called the silver grain of the wood.

**18. What are : (a) deciduous trees ? (b) exogens ?**

(a) Deciduous trees are those which shed their leaves in autumn. (b) Exogens are trees which grow outwards, by adding concentric layers of wood on the outside. All our forest trees are exogens. Trees which grow inwards are termed endogens. They include palms, canes, etc. In this class the hardest wood is found on the outside. In exogens the softest wood (sap wood) is found on the outside.

**19. How can the pine tree be distinguished from the fir tree ?**

The pine tree can be distinguished by its flat top or crown. The fir is conical in shape. Both classes have needle-shaped leaves.

**20. What are the advantages of needle-shaped leaves to the pine and fir families of trees ?**

Pines and firs grow in exposed situations, and hence experience the full force of the winds and storms. Owing to the peculiar shape of their leaves, the snow cannot lodge upon them and cause damage by its weight ; the leaves offer little resistance to the winds which blow through them without damaging them.

## **XLIV.—TITLES AND ABBREVIATIONS**

1. At a barracks, in a certain town were seen soldiers bearing the following initials on their shoulder straps : R.H.A., N.F., D.L.I., R.E., R.W.F., A.O.C. To what regiments did they belong ?

- (a) R.H.A. = Royal Horse Artillery.
- (b) N.F. = Northumberland Fusiliers.
- (c) D.L.I. = Durham Light Infantry.
- (d) R.E. = Royal Engineers.
- (e) R.W.F. = Royal Welsh Fusiliers.
- (f) A.O.C. = Army Ordnance Corps.

2. Certain important dignitaries signing a document had the following surnames : "Cantuar," "Ebor," "Sarum," "Winton," "Exon," and "Dunelm." Who were they ?

- Cantuar = Signature of Archbishop of Canterbury.
- Ebor = Signature of Archbishop of York.
- Sarum = Signature of Bishop of Salisbury.
- Winton = Signature of Bishop of Winchester.
- Exon = Signature of Bishop of Exeter.
- Dunelm = Signature of Bishop of Durham.

3. The following inscription appears on a coin of the realm : "Georgius V. Dei Gra : Britt : Omn : Rex Fid. Def : Ind : Imp : " What does it mean ?

George the Fifth, by the Grace of God, King of all Britain, Defender of the Faith, Emperor of India.

4. A boy notices in an American newspaper the following abbreviations : N.Y., Pa. ; Mass. ; Mich. ; Ky. ; Va. ; N.J. What do they stand for ?

- (a) N.Y. = New York.
- (b) Pa. = Pennsylvania.
- (c) Mass. = Massachusetts.
- (d) Mich. = Michigan.

## *Common Abbreviations and Terms*

- (e) Ky. = Kentucky.
- (f) Va. = Virginia.
- (b) N.J. = New Jersey.

5. In a church are seen the following list of contractions : I.H.S., A.V., D.D., H.J.S., S.P.G., Ch. What do they signify ?

- (a) I.H.S. = Jesus Hominum Salvator.  
Jesus, Saviour of Men.
- (b) A.V. = Authorised Version (Bible).
- (c) D.D. = Doctor of Divinity.
- (d) H.J.S. = Here lies buried.
- (e) S.P.G. = Society for the Propagation of the Gospel.
- (f) Ch. = Church or Chapter.

6. A postman sorting letters notices the following combinations of letters : W.C., N.B., S.W., R.S.O., E., c/o. Explain the meaning of the same.

- (a) W.C. = Western Central.
- (b) N.B. = North Britain.
- (c) S.W. = South West.
- (d) R.S.O. = Receiving Sub-Office.
- (e) E. = East.
- (f) c/o = Care of.

7. What title is given to : (a) A baron ? (b) An ambassador ? (c) A bishop ? (d) A lord mayor ?

- (a) The Right Honourable, Lord, etc.
- (b) His Excellency.
- (c) The Right Reverend, Lord Bishop.
- (d) The Right Honourable the Lord Mayor.

8. A person visiting a post office notices these abbreviations : D.L.O., P.M.G., P.T., P.O.O., G.R. What do they represent ?

- (a) D.L.O. = Dead Letter Office.
- (b) P.M.G. = Postmaster General.
- (c) P.T. = Post Town.



## *Military and Nautical Titles*

(d) P.O.O. = Post Office Order.

(e) G.R. = Georgius Rex.

9. A clerk in an army pay office sees the following initials and contractions : F.M., Q.M.G., F.O., Comdt., Lt., N.C.O. To what did they refer ?

(a) F.M. = Field Marshal.

(b) Q.M.G. = Quarter-Master General.

(c) F.O. = Field-Officer.

(d) Comdt. = Commandant.

(e) Lt. = Lieutenant.

(f) N.C.O. = Non-commissioned Officer.

10. What title is given to (a) A baron's son ? (b) A dean ? (c) A prince ? (d) A privy councillor ?

(a) The Honourable. His wife also takes the title Honourable.

(b) The very Reverend.

(c) His Royal Highness.

(d) The Right Honourable.

11. Explain the nautical terms : S.O.S., A.B., R.M.S., H.P., W.S.W., C.H.

(a) S.O.S. = Save Our Souls.

(b) A.B. = Able-bodied Seaman.

(c) R.M.S. = Royal Mail Steamer.

(d) H.P. = Horse Power.

(e) W.S.W. = West South-West.

(f) C.H. = Custom House.

12. A boy notices in the street these abbreviations : M.P.S., L.D.S., M.R.C.V.S., M.R.I.B.A. Say what they mean.

(a) M.P.S. = Member of the Pharmaceutical Society.

(b) L.D.S. = Licentiate in Dental Surgery.

(c) M.R.C.V.S. = Member of the Royal College of Veterinary Surgeons.

## *Common Contractions and Terms*

(d) M.R.I.B.A. = Member of the Royal Institute of British Architects.

13. An "Honours List" includes the following awards: O.M., K.C.S.I., G.C.V.O., Kt., K.C.M.G. Say what they represent.

(a) O.M. = Order of Merit.

(b) K.C.S.I. = Knight Commander of the Star of India.

(c) G.C.V.O. = Grand Commander of the Royal Victorian Order.

(d) Kt. = Knight.

(e) K.C.M.G. = Knight Commander of the Order of St. Michael and St. George.

14. Explain the following : viz., i.e., P.T.O., e.g., xd., D.V.

(a) Viz. = Namely, to wit.

(b) i.e. = Id est ; that is.

(c) P.T.O. = Please turn over.

(d) e.g. = Exempli gratia ; for example.

(e) xd. = Without dividend.

(f) D.V. = Deo volente ; God being willing.

15. A person sees the following contractions : Beds., Berks., Hants., Herts., Notts. What do they represent ?

(a) Beds. = Bedfordshire.

(b) Berks. = Berkshire.

(c) Hants. = Hampshire.

(d) Herts. = Hertfordshire.

(e) Notts. = Nottinghamshire.

16. A staff of a certain school includes an M.A., B.Sc., F.R.G.S., B.D. What are their respective diplomas ?

(a) M.A. = Master of Arts.

(b) B.Sc. = Bachelor of Science.

## *Various Terms and Expressions*

(c) F.R.G.S. = Fellow of the Royal Geographical Society.

(d) B.D. = Bachelor of Divinity.

17. Explain these : D.C.L., D.L., C.I., A.S., A.D.C.,  
Et seq.

(a) D.C.L. = Doctor of Civil Law.

(b) D.L. = Deputy Lieutenant.

(c) C.I. = Crown of India.

(d) A.S. = Anglo-Saxon ; Academy of Science.

(e) A.D.C. = Aide-de-Camp.

(f) Et Seq. = And the following.

18. In referring to money why do we often use the letters L. S. D. ?

Because they form the first letters of the words Librae, solidi, denarii Latin words for pounds, shillings, and pence.

19. What title do we give to (a) A man in France ?  
(b) A married woman in England ? (c) An unmarried woman in France ? (d) A man in Italy ?

(a) Monsieur.

(b) Madam.

(c) Mademoiselle.

(d) Signor.

20. Explain fully : M.R.C.S., MS., F.R.S., Ib., P.S.,  
Finis.

(a) M.R.C.S. = Member of the Royal College of Surgeons.

(b) MS. = Manuscript.

(c) F.R.S. = Fellow of the Royal Society.

(d) Ib. or Ibid = In the same place.

(e) P.S. = Postscript written after the signature.

— (f) Finis = The end.

## XLV.—TOPOGRAPHY.

### 1. What is an ordnance survey map ?

•An ordnance survey map is one which is made from data secured by Government officials whose duty it is to make a survey of the different parts of the United Kingdom. The men generally belong to the Royal Engineers. It is part of their duty to prepare any maps which may be required for military purposes.

### 2. What provision is made on all authoritative maps, in order that distances may be read ?

A scale of miles is always included in maps which are of any value.

### 3. What is a relief map ?

A relief map is one in which the surface is represented as it actually is instead of as a flat surface. Usually the heights are represented on a much larger scale than horizontal distances.

### 4. Name any means adopted to show relief on an ordinary map.

The two common methods of showing relief are by (a) hachures, (b) contour lines.

### 5. What are "hachures," and of what use are they ?

Hachures are shading lines which are used on a map to indicate the relief of the district represented. The closeness and thickness of the lines increase with the increasing steepness of the land, the highest summits being thereby emphasised by the heavy shading. Intermediate heights are represented by lighter shading, and the lowest parts by still lighter shading.

## *Theodolite—Bench Mark*

### **6. What is a theodolite ?**

A theodolite consists of a telescope mounted on a stand so that it can be rotated horizontally or vertically. It is used for measuring angles in both horizontal and vertical planes. The angles are measured on graduated arcs or plates.

### **7. A person wishes to become conversant with the footpaths, roads, bridges, etc., in a certain district. How can he get to know them ?**

An ordnance survey map of the district can be purchased from a bookseller. Whilst those of separate towns and districts are generally on a fairly large scale, those of parishes are on a still larger scale, and from them fuller details can be obtained.

### **8. Why is it possible to include the features referred to in the last question on some maps and not on others ?**

A great deal depends on the scale adopted. Where this is small, as in the case of maps representing wide areas, it is only possible to show the most prominent features such as the largest towns and cities, rivers, lakes, etc. Such features as churches, bridges, roads, footpaths, cemeteries, etc., can only be included when the scale is very large.

### **9. What is a bench mark, and where is it usually found ?**

A bench mark is a sign placed on some important building or structure, such as a railway bridge, to indicate that the district has been surveyed by the officers of the Ordnance Survey. It marks a point from which differences of level are measured.

## *Contours—Sea-level*

### **10. What are contours ?**

Contours are lines passing through all places in the district dealt with which are at the same height above sea-level.

11. A town is situated at sea-level. On each side of it, say east and west, contour lines marked 100, 200, 300, 400 are noticed on the map. What do you know of the position of the town from this information ?

These marks indicate contour lines of 100, 200, 300, 400 feet, and point out that the land gradually rises both to the east and west of the town. Hence it is situated in a valley sheltered from winds from the east and west. The valley runs north and south.

12. What is shown when contour lines are close together ? When they are some distance apart ?

Where contour lines are close together the slope is steep. Where they are farther apart, as in the case of the plain of Lombardy, the slope is very gentle, or the land is quite flat.

13. When is it impossible to represent a height by contour lines in the ordinary way ?

When slopes are very steep, as in the case of a headland like Flamborough Head, the contours are so close together that they practically coincide, hence it is not possible to represent them on the map.

14. What is meant by (a) sea-level ? (b) stream-line ?

(a) By sea-level is meant the surface continuous with that of the ocean at mean tide. It is the level from which heights of mountains, hills, cliffs, etc., are measured.  
(b) The "stream-line" is the name given to the shortest

## *Plane-table—Ordnance Survey Map*

line drawn from one contour line to another. This gives the line of steepest slope.

15. A cyclist is starting from a certain village. To the north the contour lines show 100 feet, 200 feet, 300 feet. To the south the district is level. Which would be the easier direction in which to ride, north or south?

The contour lines plainly indicate that the land rises to the north, hence the more difficult ride would be up this slope.

16. What is a plane-table? How is it used?

A plane-table is a flat board mounted horizontally on a tripod. It is fitted with a ruler at each end of which is a sight. It is used as follows: A base line is measured and reproduced to scale on a sheet of paper on the plane-table. The plane-table is placed at one end of the base line, and the line drawn on it brought into line with the base line. The ruler is then pivoted at one end of the line and a point is sighted along it. A line is drawn in this direction. The same point is again sighted from the other end of the base line. The intersection of the two lines gives the position of this point.

17. A dispute arises between two men as to the size of a certain field. How can they settle which is in the right?

In the ordnance survey map for the district the area of the field will be accurately recorded, and reference to this will settle the point.

18. What is usually put on a local map in order to show direction?

A "pointer" is placed on maps of small areas to indicate direction. The pointer points to the north.

## *Map Reading—Gradients*

19. When a cyclist refers to his map to see in which direction he must proceed, what must he be careful to do before he begins to read his map?

He must place his map to correspond with the points of the compass. Otherwise he may go miles out of his way, as there are two "right" sides to a road dependent on the direction in which one is travelling, but there is only one north or south side.

20. What is meant by a gradient, and how are road gradients measured?

A gradient is a rise. Road gradients are measured by means of a gradientor. This is a telescope mounted on a tripod, fitted with a spirit level and a graduated vertical arc.



## XLVI.—THE TOWN.

**1. A man wishes to know whether he is on 'the voters' list for the district in which he lives. What is a ready means of ascertaining this ?**

The names of all persons entitled to vote in a district are printed on a list which is exhibited at the entrances to churches, chapels, post offices, police stations and libraries in that district. They are printed in alphabetical order and full descriptions of the voters are given, as well as names and addresses. If his or her name is not in the list an application may be made for its insertion.

**2. How is it that fogs are more prevalent in the town than in the country ?**

It has been found that the vapour of the atmosphere condenses round dust particles in the air. As the air of towns contains far more dust particles than that of the country, fogs are far more frequent in towns.

**3. A person wishes to take a tramcar. How can he tell when the tramcar is at some distance away whether it is the one which will travel his way ?**

Practically all towns and tramway companies have adopted the method of numbering their cars. The figures are placed in a prominent position, both at the front and back of the car. They are illuminated at night, so that they can be seen by intending passengers some distance away. The different numbers refer to different districts, and residents are generally familiar with these details.

**4. Why is a policeman sometimes called a "bobby" or a "peeler" ?**

In the eighteenth century there were no policemen. Watchmen paraded the streets, ringing a bell to herald

## *Motor Car Number Plates—Town Trees*

their approach. In 1829 Sir Robert Peel introduced the police system, and his work is perpetuated in the nicknames "bobby" and "peeler."

5. The word "silence" is printed in large letters at the entrance to a public building in a town. What does it signify?

This injunction is generally found at the entrance to a public reading room and library where talking would interfere with readers.

6. Why do motor cars bear number plates? Is there any exception to this rule?

Motor cars bear number plates for identification purposes. Different letters and combinations of letters represent different boroughs and county areas, hence it is possible to trace the owner of any car by means of his number plate, in case of dangerous driving or neglect to obey police directions. Each number is registered in the area in which the licence is registered. No number plate is carried by the royal motor cars.

7. What tree thrives best in the streets of a town, and why?

The plane tree is found to thrive better than any other tree in town areas. These trees have special powers of resisting the effects of the smoky atmosphere.

8. Why does a gasometer rise and fall?

When the gas reaches the gasometer which is nicely balanced by water and air, it rises until it is full. As the gas is distributed to the houses, shops, etc., the gasometer sinks slowly down into the water again. The gas is forced along the pipes by the pressure of the gasometer.

## *Flowers in Town Gardens—Electric Bells*

### **9. What flowers grow best in town gardens ?**

Flowers which thrive well in town gardens include : chrysanthemums, michaelmas daisies, carnations, pyrethrums, daffodils, violas, shirley poppies, mignonette. As wall plants, clematis montana and winter jasmine rank first.

### **10. What steps are taken in a town to prevent animals being badly treated ?**

The Royal Society for the Prevention of Cruelty to Animals carries on this work. The society pays inspectors to devote their time to seeing that animals are treated kindly and sympathetically. Warnings are issued to guilty parties, and prosecutions instituted where these fail to have the desired effect. Stray cats and dogs are dealt with, and awards made to those who display bravery in attempting to mitigate the sufferings of animals.

### **11. Why does an electric bell ring when the button is pressed ?**

Wires from electric cells pass to the bell and back to the cells. There is a break in the wires beneath the bell-push. When the button is pressed a piece of metal closes this gap and completes the electric circuit. A current then passes through the bell and causes it to ring.

### **12. What do we mean by " The Lungs of a City " ?**

By the " Lungs of a City " we mean the parks and open spaces which provide means of recreation for the people and children. The air is fresher and purer here than in the narrow and confined streets.

## *Public Washhouses—Inquests*

**13. Cottages in towns are very often built without any accommodation for washing clothes. How is this deficiency overcome in many places ?**

In many towns and cities women are now able for a small charge to wash their clothes at public washhouses. The conditions are healthy, and appliances to expedite the work are provided.

**14. When a fatal accident happens in a town, what steps are taken to enquire into the circumstances ?**

An official, called a coroner, is deputed to enquire into the circumstances. He is assisted in his work by twelve men who form the jury. Evidence is considered, and recommendations may be made to ensure that precautions shall be taken to prevent the recurrence of such an accident. Persons found guilty of negligence are censured, and in some cases passed on to the police authorities to be further dealt with.

**15. We often read in the newspapers that the magistrate was presented with a pair of "white gloves." Explain the reason for this.**

If there is no case for trial when a magistrate takes his place on the bench, it is customary to present him with a pair of white gloves, symbolic of innocence and purity.

**16. What building in a town or city generally shelters flags of regiments ?**

These tattered and time-honoured relics generally find a place in the parish church of the town associated with the regiment whose deeds the flags commemorate.

## *Factory Accidents—Fire Escapes*

**17. Why are factory accidents far less frequent nowadays than they were a century ago ?**

Because : (a) Modern machinery is protected in a far more effective manner than it was a century ago. (b) Protection against fire is now compulsory in all large factories. (c) Fire escapes and other life-saving appliances are provided.

**18. In large towns outside iron staircases are often seen leading from the various floors of large buildings to the ground. For what purpose are they used ?**

These are provided in case fire should break out. The occupants are then able to escape by this means. Otherwise they might find themselves cut off and might meet with death through suffocation or burning.

**19. Many towns are now lighted by electricity. Where does it come from ?**

The supply of electricity in most towns is now provided by the corporation. At the central station electricity is generated, and is then transmitted for various purposes—including the lighting of houses and streets, driving of machinery, propelling of tramcars and trains, heating of rooms—a charge being made according to the rates fixed locally.

**20. What steps must a person take before he can commence business as a hawker ?**

(a) He must secure a licence. (b) Before doing so, he must produce a certificate of good character signed by a clergyman and two householders of his parish, or an inspector of police, or a justice. Hawking without a licence is a punishable offence.

## XLVII.—THE WAR.

### 1. What was the immediate cause of the Great European War?

The immediate cause of the Great European War was the assassination of the Archduke Francis Ferdinand (heir to the Austrian throne) and his wife, by Gabriel Principe, a Serbian, at Serajevo, Bosnia, on June 28th, 1914. The Serbians regarded the Austrians as their greatest enemies, and this feeling of antagonism led to the crime which was used as an excuse by the Central Powers for the outbreak of the war.

### 2. Which Treaty was referred to as, "a scrap of paper"?

In 1839 the Treaty of London was signed by representatives of England, France, Austria, Prussia, and Russia. It guaranteed the independence and neutrality of Belgium. Under the terms of this treaty Belgium was never to make an alliance or treaty of a military character with any other country or allow her territory to be used for military purposes. When Sir Edward Grey, who was Foreign Secretary of England in 1914, asked Germany whether she intended to respect this treaty to which she was a party, the German Chancellor said that he was surprised that we should attach so much importance to "a scrap of paper."

### 3. What do you know of the "contemptible little army"?

The members of the British Expeditionary Force (1914) were referred to in these terms. A few days before they came into contact with the German Army at Mons the Kaiser is said to have issued an order to his Generals, in which the following words occurred, "It is my Royal and Imperial Command that you concentrate your energies for the immediate present on one imme-

## *Battle of the Marne—Triple Entente*

diate purpose, and that you address all your skill, and all the valour of my soldiers, to exterminate first the treacherous English and walk over General French's 'contemptible little army.' ”

**4. Which battle fought early in the war shattered the hopes of the Central Powers ?**

The Battle of the Marne, fought in September, 1914, when the Germans were within a day's march of Paris, proved disastrous to the hopes of the Central Powers. The battle raged over a front of 120 miles from Paris to Verdun. Before the British and the French, the Germans were compelled to fall back as far as the Aisne. They lost thousands of prisoners and large numbers of guns and much ammunition.

**5. What is meant by the “ Triple Entente ” ?**

Germany made an alliance with Austria after having defeated her in 1866, and induced Italy to join them, thus forming the “ Triple Alliance.” To meet this combination France and Russia formed a “ Dual Alliance.” Later on England joined the latter group, and this friendship went by the name of the “ Triple Entente,” from the French word “ entente ” meaning “ understanding.”

✓ **6. What do you know of (a) the “ Emden ” ? (b) “ the Anzacs ” ?**

(a) The “ Emden ” was a famous German raider which preyed on British commerce and sank a large number of merchant vessels. She escaped detection for some time by means of clever ruses, but was eventually destroyed by H.M.S. “ Sydney ” of the Australian Navy. (b) The Anzacs were the men of the Australian and New Zealand Forces. The name was suggested by the initials of the words “ Australian and New Zealand Army Corps.”

## *Coalition Government—General Botha*

7. Say what you can about the "Coalition Government."

In May 1915 it was felt that the energies of the Government should be directed solely to the task of conducting the Great War, and that "party politics" should be dropped. As a result of this feeling a "National" or "Coalition" Government was formed. The Liberal, Labour, and Unionist parties were all represented in the Cabinet.

8. What services did General Botha render during the war?

Shortly after the outbreak of war a revolt occurred in South Africa. It was headed by Maritz a former Boer leader, and De Wet. The rising was put down by the Prime Minister of South Africa, General Botha. Later on he planned a campaign against German South-West Africa. Under his skilful guidance the colony was rapidly conquered and occupied by the British.

9. What is meant by (a) internment? (b) poison gases? (c) camouflage?

(a) By internment is meant confining in a camp or fortress, or otherwise placing under restraint. It is resorted to when war breaks out between two nations in order that natives of enemy countries may be prevented from communicating information to the enemy. (b) Poison gases were introduced by the Germans in the World War at the second Battle of Ypres. Chlorine and other poisonous gases were discharged from tubes when the wind was favourable. Shells which discharge poisonous gases when they burst have also been used in large quantities. (c) "Camouflage" means protective colouring, and is used to deceive an enemy. It is largely practised on the battlefield. Ships have been painted with erratic stripes to make it difficult for a distant enemy to tell one part of the ship from another.



## *Moratorium—Terms—R.A.F.*

**10. What steps were taken in August, 1914, to conserve our gold currency? What is a moratorium?**

(a) In August, 1914, currency notes for twenty shillings and ten shillings were issued. They are legal tender for the payment of any amount and have almost entirely displaced gold coins. (b) A moratorium is an emergency Act of legislation, authorizing a Government bank to suspend specie payments for a given period.

**11. Explain the terms (a) "Waacs," (b) "Wrens," (c) "Red Tabs."**

(a) The term "Waacs" denotes "Women's Army Auxiliary Corps," the word being made up of the initials of the title. The force consisted of women who offered themselves voluntarily for work in connexion with the Army forces. (b) The "Wrens" is a term used to describe the members of the "Women's Royal Naval Service," the initials of these words again providing the word. These women enrolled in order to assist the work of the Navy. (c) "Red Tabs" denotes members of the Army Staff, the slang term being suggested by the "red tabs" and red hat band which are the distinguishing mark of those attached to the Army Staff.

**12. Which fighting force was created in Britain during the World War?**

The Royal Air Force was constituted a separate arm of the fighting forces by amalgamating the Royal Naval Air Service and the Royal Flying Corps in the summer of 1918.

**13. Name any great leaders, either civil or military, who died during the period of the War.**

(a) Lord Kitchener, who was drowned whilst proceeding on a mission to Russia. (b) Lord Roberts, a former "Commander-in-Chief" of the British Army, who died whilst on a visit to the battlefield in France. (c) Francis

## *Terms—Canadians—Rationing*

Joseph, Emperor of Austria. (d) General Maude, the British Commander in Mesopotamia. (e) Lord Rhondda, Food Controller in England. (f) Nicholas II., Ex-Tsar of Russia, supposed to have been shot.

14. What do you know of (a) "Conchies" ? (b) "Bertha" ? (c) "Batmen" ?

(a) "Conchies" was a slang term applied to those who, although liable to military service, were exempted because of their principles. The title was derived from the term "Conscientious Objectors," by which they were officially designated. (b) "Bertbas" was the name given to the long-range guns used by the Germans for the long-range shelling of Paris. The name is from Bertha von Krupp. (c) "Batmen" are military servants, and derive their name from the fact that formerly they had charge of a bat-horse or baggage horse and its load.

15. Explain the fact that nearly half the fighting scouts with the Royal Air Force on the Western front during the War were Canadians.

A successful airman must have exceptionally keen eyesight, and a quick imagination with the power to control it. The possession of these characteristics explains why such a large proportion of our fighting air scouts were Canadians.

16. In order that food supplies shall be fairly and evenly distributed, what measures are taken during a period of prolonged warfare ?

A system of rationing essential food stuffs is adopted, whereby supplies are fairly distributed and allotted. Customers are registered, and every means taken to ensure that both rich and poor shall be treated alike as far as quantity per head is concerned. Prices as well as supplies

## *Terms—President U.S.A.*

are controlled and fixed, heavy fines for contravention being imposed.

17. Explain the terms. (a) "B.E.F.," (b) "D.O.R.A." (c) "R.A.F." (d) "M.A.R.O."

(a) "B.E.F." signifies the "British Expeditionary Force," and refers to that body of men who were engaged in military service on the Western front. (b) "D.O.R.A." signifies "Defence of the Realm Act," a measure passed by Parliament giving special and very extensive powers to the Government in connexion with war measures. (c) "R.A.F." denotes "Royal Air Force." (d) "M.A.R.O." signifies "Munitions Area Recruiting Officer." It was his duty to recruit men from munition industries, and to see that men who could best be spared were taken.

18. What is meant by (a) A dug-out? (b) "silver bullets"? (c) "C.M.B."?

(a) A "dug-out" is the name given to a trench in which a man can stand erect without being seen. It is usually covered with a roof, specially protected from shells, etc. It is also used as a slang name for elderly people who returned to work for the period of the war. (b) No ammunition can be produced without money. Hence people who lent to the Government were said to be firing "silver bullets" at the enemy. (c) "C.M.B." means "Coastal Motor Boats." They have rendered gallant service in patrol work, hunting for submarines, etc.

19. Why does the President of the United States, although the General Commander-in-Chief of the Forces, appear in ordinary clothes at military and naval functions?

Because the military power is regarded as being subservient to the civil power in the American Republic.

## *"Red Cross"—Y.M.C.A.*

**20. What two voluntary organisations did much for our fighting men during the Great War ?**

(a) "The British Red Cross Society" did invaluable work in connexion with the transport of the sick and wounded, and with hospitals abroad and at home.

(b) The Y.M.C.A. attended to the social side in the lives of our fighting men. Facilities for reading, writing, games, etc., were provided, both at home and abroad, wherever our men were on service. Courses of study and instruction were provided, in order to enable active service men to fit themselves for the return to civil life.

## XLVIII.—WATER.

### 1. What are the chief characteristics of good water ?

Good drinking water should be : (a) clear, sparkling, and palatable, (b) aerated, (c) free from organic matter, (d) not very hard.

### 2. Why is water an important article of consumption ?

The solid portions of our food are dissolved in water. They then enter the blood and feed the tissues of the body. Without a sufficient supply of water—say four pints daily—the health cannot properly be maintained.

### 3. What are the main characteristics of a good filter ?

The main characteristics of a good filter are : (a) All parts should be readily accessible for purposes of cleaning and renewing. (b) The filtering material should remove suspended impurities. (c) The filtering material should not yield impurities to the water. (d) The filtering material should not encourage the growth of low forms of life in the water. (e) There should be nothing in the filtering material to prevent a steady flow of water.

### 4. How is water purified on a large scale ?

On a large scale water is first collected in a large reservoir. Here the heavier impurities settle. The water then passes through filter beds consisting of sand and gravel. These remove the lighter impurities. The water then passes into the service reservoir ready for passing to the mains for use.

### 5. Why is spring water purer than surface water ?

Surface waters often abound in organic impurities, but water which passes through various layers of soil which act as filters, is cleared of suspended impurities.

## *Water—Its Impurities and Diseases*

Hence the water of springs and wells is as a rule good for drinking purposes.

### **6. What are the chief sources of impurities in drinking water ?**

(a) Impurities at the source. Water may pass over soluble mineral substances. It may be contaminated by proximity to manure heaps, cesspools, etc. (b) Impurities of transit and storage. These include impurities from dwellings and factories. Surface wells may receive surface washings and soakings from soil, whilst exposed cisterns may receive dust and other impurities. (c) Impurities of distribution. Lead may be dissolved from the surface of the pipes through which water flows.

### **7. What effect has water containing mineral impurities on the health ?**

Various ailments are attributed to the use of drinking water containing mineral impurities. Diarrhœa is certainly caused by the irritant effect of small particles of certain minerals suspended in water. In India, for example, diarrhœa is often set up by the action of fine scales of mica suspended in the water.

### **8. Which infectious diseases are often propagated by means of contaminated water ?**

Two diseases often spread by the use of contaminated drinking water are cholera and typhoid fever. Water contaminated with sewage in which the germs of these diseases existed, has been proved to be a means of propagation of both these, hence the importance of securing a supply of water free from contamination by sewage in any form.

## *Impurities—Organic and Mineral*

**9. How do you account for the organic impurities sometimes found in water ?**

Organic impurities may be of vegetable or animal origin. The former, unless present in large quantities, are not harmful. Animal impurities, which are far more dangerous, are derived from sewage and find their way into the water by soaking through the soil from manure heaps, sewers, etc., or they may be washed into the water during heavy rains. Sewage is frequently poured directly into rivers. Hence river water is liable to contamination and great care is necessary in using it as drinking water.

**10. What mineral impurity is often found in water ? How can it be removed ?**

Carbonate of lime is frequently found as an impurity in water. It can readily be removed by boiling the water. In small quantities it does not appear to have any injurious effect upon the system, but water is certainly better without it.

**11. Why is water as a natural product never found chemically pure ?**

Water is the greatest solvent known. It dissolves some at least of most substances with which it comes into contact. For this reason it is never found chemically pure in nature.

**12. Explain what is meant by "hard" and "soft" water ?**

Hard water is that which has mineral matters in solution. It is not easy to obtain a permanent lather with hard water because the dissolved matter combines with the soap. Soft water contains little dissolved matter and easily forms a lather with soap.

## *Filters—Spring Water—Artesian Wells*

✓13. Why is it unsafe to drink rain water which has not been filtered?

Rain water is frequently contaminated by impurities taken up from the surfaces on which it falls. Such impurities include decayed leaves, soot, feathers, etc. Lead and zinc may also be dissolved if the water passes along pipes or is collected from galvanized roofs. The only circumstances under which rain water can be used with safety without being filtered are in the open country where the atmosphere is free from impurities, and where clean vessels are used to collect the water.

14. Why is spring water usually "hard"?

As water passes through layers of rocks it dissolves various mineral matters, especially carbonate of lime. As it passes through the soil its solvent properties are increased by organic acids which are derived from the organic matter which it meets with in the soil.

✓15. What precaution should be taken when making a surface well?

Surface soils may yield good water provided they are protected from any risk of pollution from surface washings. The well should be sunk as deep as possible into the water-bearing stratum. It should be lined with bricks and cement, and this protection should be carried sufficiently high above the ground to prevent impurities from entering and fouling the water in the well.

16. What is an artesian well?

Artesian wells are of great depth, and are so called because they were first made at Artois in France. These wells tap water-bearing strata beneath impervious strata of rock. The water rises in the bore-hole into an ordinary well made at the surface and thoroughly protected by a cement and brick lining.



## *Water Power—Water Mills—Reservoirs*

**17. Why were many of the early cotton and woollen mills built on the banks of swiftly-flowing streams ?**

Before the steam engine was developed the power of swiftly-flowing water was used to work the machines in the mills. Hence old mills were situated on the banks of such rivers as the Derwent, Dee (Wales), and the tributaries of the Yorkshire Ouse.

✓ **18. What use is now made of the force of running water ?**

The great waterfalls of the world are now used to generate electricity. The power supplied by the water drives machines which produce electric currents. These are carried along wires to supply power to drive engines, tramcars, etc., and to light towns and cities. Such arrangements are now at work at Niagara, along the Mississippi, and at Kinlochleven in Scotland.

**19. What objection was there to the old type of water-mill used for grinding flour ?**

The supply of water is usually variable. It is sometimes lacking altogether. At the end of the summer when the farmer desired to grind his corn, the supply is generally smallest. Steam mills have for these reasons almost entirely superseded the old type of water-mill.

**20. What is a reservoir ?**

A reservoir is a large place of storage for water. It is usually situated in an elevated position so that the water it contains may be distributed by gravitation. The water is usually distributed along large cast-iron pipes.

## XLIX.—WATERWAYS.

✓ 1. Why are towns usually found situated in river valleys ?

• Valleys through which rivers flow contain soil which has been brought down by the river and deposited there in past ages. This soil is very fertile and therefore such valleys provide food for large populations. Hence it is that along the sides of rivers towns are found in greater numbers than where such conditions are absent. The uses of a river for carrying purposes and for supplying power for working machinery in earlier times also contributed to the growth of towns in close proximity to it.

2. All the longest rivers in England flow towards the east. Why is this so ?

The watersheds of England are found nearer to the west coast than to the east, hence the longer land slopes are to the east, the shorter ones to the west. The lengths of these slopes determine the lengths of the rivers.

✓ 3. Why do some rivers flow slowly and others more quickly ?

When a river rises at a low elevation and has a long course, the slope is very gradual and hence it will have a slow current. Those rivers which rise in high ground and have short courses flow down steep slopes and hence they have swift currents.

4. How is it that many of the old ports of England are now of little importance ?

• Many old English ports, *e.g.*, King's Lynn, Boston, have fallen into disuse very largely because large ocean-going steamers are unable to approach them. The rivers

## *Sea-ports—Cañons—Tidal Rivers*

on which they stand are only navigable for small vessels, and in many cases sand forms a great barrier to navigation.

**5. Why are sea-ports usually situated some little distance up a river ?**

Because they are there sheltered from the waves, and because the mouths of the rivers very often form natural harbours.

**6. What do you know of the Grand Cañon of Colorado ?**

The river has carved out a deep gorge which is in places 6,000 feet deep and not more than a mile in width. The causes which have produced this remarkable gorge are the cutting action of the stream, and the lack of rainfall. This has prevented the disintegration of the rocky walls by the action of frosts and springs.

**7. What is meant by a meandering river ?**

A meandering river is one in which one bend of the river closely approaches another. This occurs on low-level ground where any slight obstruction serves to turn the river from its course. The word comes from the Greek river Meander.

**8. What proves a great bar to the navigation of many tidal rivers ?**

Many rivers bring down an immense amount of matter which is deposited at their mouths, forming banks and bars. These are great obstacles to navigation. In many instances these obstacles are removed by the action of strong tides, and by means of dredging.

## *Delta—Terms—Embankments—Nile*

### **9. What is a delta ?**

A delta, (from Greek letter D,  $\Delta$ ) is a tract of low and level land of triangular shape, formed at the mouth of a river. It is caused by the river depositing suspended matter when it reaches the sea. As the accumulation grows the river is blocked up. It finds a way round the obstruction, very often on each side of it. This process is repeated again and again so that a network of channels is formed. .

### **10. What is meant by (a) a packet station ? (b) a roadstead ? (c) a natural harbour ?**

(a) A packet station is a place from which passenger vessels sail at regular and stated times. (b) A roadstead is a place of anchorage off the shore without the protection of a harbour. (c) A natural harbour is one which does not require the construction of piers and breakwaters to make it safe for ships.

### **✓ 11. Why is it necessary to build embankments along the side of many large rivers ?**

Frequently a river brings down quantities of matter in suspension and deposits some of it on its own bed. In this way its bed gradually rises until during flood time the river overflows its banks. To prevent damage by flooding, embankments or levées are built. A river sometimes flows between embankments at a considerable height above the surrounding country.

### **12. What country depends for its existence upon the work done by its greatest river ?**

Egypt is dependent for its fertility upon the Nile, which overflows its banks every spring and leaves behind upon the surface of the land a coating of rich

## *Canal—Ship Canals—Canal Traffic*

mud. This mud makes the soil of Egypt one of the most fertile soils in the world.

### **13. What is a canal ?**

A canal is an artificial waterway. Canals are cut for the conveyance of goods or passengers by boat or ship, or for purposes of drainage or irrigation.

### **14. Why are ship canals often constructed ?**

Ship canals are constructed to provide a cheap method of transportation between ocean and ocean or between the ocean and some inland town.

### **15. What is meant by a lateral canal ?**

Lateral canals are those which connect two places in a valley, or which connect two adjoining river systems, by crossing at the most convenient point the ridge separating the valleys. They also provide a waterway in place of a portion of a river, where owing to waterfalls, sandbanks, or other obstructions the river navigation is rendered difficult or impossible.

### **16. What provision is made to prevent damage being done to canals by insects and animals burrowing into the bed of it ?**

Where the soil at the bottom of a canal is porous, the sides and bottom are lined with clay mixed with sand and gravel. This prevents percolation of water and damage by burrowing of rats, etc.

### **17. What are the main disadvantages connected with canal traffic ?**

Traffic is slow and delivery of goods is often unpunctual. In winter time ice often forms on canals

## *Canal City—Canal Workers—Irrigation*

causing serious delay. On many canals ice-breakers patrol in the winter time, keeping the passages free for navigation.

**18. Which city is the centre of England's system of canals ?**

Birmingham is the centre of the canal system of England. It is connected with Liverpool, London, Hull and Bristol by means of canal and river courses combined.

**19. What precautions are taken to ensure that canal workers are properly supervised ?**

The Canal Boats Act provides for the registration of all canal boats, their sanitary condition and inspection, and the education of the children on the boats.

**20. What is meant by irrigation ?**

By irrigation is meant artificial watering of the soil by bringing to it a part of the water in a stream or river. The swollen waters of a river in flood time are conserved either in specially constructed tanks or reservoirs, or in channels cut out for the purpose. The water is allowed to flow over the land in time of drought.

## L.—WINDS, TIDES, CURRENTS, &c.

### 1. What are winds, and how are they caused ?

Winds are movements of the air and are caused by air passing from an area of high pressure to an area of low pressure. Differences of pressure in the air are brought about, as a rule, by differences in temperature and differences in the amount of moisture present in the air.

### 2. Why are the trade winds of less importance now than formerly ?

Trade winds in the days of sailing vessels were of great importance because they gave great assistance to mariners going to the tropics. When once they had reached the region of the North-East trade wind (between the Tropic of Cancer and about  $30^{\circ}$  N. Lat.) their vessels were carried swiftly towards the Equator. If they wished to go further they made use of the currents of the South Atlantic which carried them towards the Cape of Good Hope.

### 3. Why do heavy rains fall in the tropics ?

As the trade winds (N.E. and S.E.) travel towards the tropics they absorb much moisture from the warm surface of the ocean over which they pass. This warm air charged with moisture rises, and much of the moisture is condensed by cooling. In this way the tropics get torrential downpours.

### 4. What are monsoons ?

Monsoons are seasonal winds which blow over the Indian Ocean and adjacent lands. The north-east

## *Doldrums—East Winds—Sea Breezes*

monsoon blows during the winter months from October to March, and the south-west monsoon from April to September.

The north-east monsoon is caused by the cooler air over the land mass of India, passing to an area of lower pressure over the ocean, which retains its heat longer than the land.

### **5. What is meant by the "Doldrums" ?**

The "Doldrums" is the name given to that part of the ocean where calm or baffling winds prevail. In the days of sailing ships, sailors dreaded the idea of getting into this belt. Very often they had to remain for weeks, while the great heat and lack of occupation made life most irksome. Frequently they ran short of water and food. We speak of any one as being "in the Doldrums" when they are in low spirits.

### **6. Why are the east winds the coldest ones experienced in England ?**

East winds are prevalent in England in spring time. They blow across an enormous stretch of land which is still under wintry conditions, hence the keenness and biting force of the east winds. Dryness and coldness are their unfailing characteristics.

### **7. Why do sea breezes blow in the day-time, and land breezes at night ?**

During the day the air above the land becomes hotter than the air above the sea. The area of high pressure is therefore over the sea and a landward breeze results. During the night the air over the sea is warmer than the air over the land, and a seaward breeze results.



## *Winds—Tides—Cyclones*

### **8. What are the Simoon, Solano, and Sirocco ?**

The "Simoon," "Solano," and "Sirocco" are sub-tropical desert winds. Hence they are very hot and dry. The "Simoon" blows in Arabia, the "Solano" in Spain, and the "Sirocco" in Italy. The two latter blow from the Sahara Desert.

### **9. What are tides, and how are they caused ?**

Tides are the risings and fallings of the sea. There are usually two high tides each day. The attraction of the moon and the sun is greater on the water on the side nearest them than it is on the solid mass of the earth, because the latter is further away. Hence the water is lifted. At the further side of the earth the attraction is less and the water is left behind.

### **10. What are (a) spring tides ? (b) neap tides ?**

(a) Spring tides occur at new and full moon. There are high high tides, and low low tides. (b) Neap tides occur in the intervals. The high tides are not very high and the low tides not very low.

### **11. Why has the Mediterranean Sea practically no tide ?**

The Mediterranean is practically an inland sea, and has only small tides because the Strait of Gibraltar is too narrow to admit the tidal wave. A small tide is produced in the waters of the Mediterranean itself.

### **12. What is a cyclone, and how can we tell when one is approaching ?**

In the tropics and temperate regions storms are frequently called cyclones in which the wind blows spirally towards a centre. A cyclone is constantly moving its

## *Tidal Bore—Icebergs—Fogs—Currents*

position, generally in a more or less easterly direction. The approach of a cyclone is indicated by an unusually high barometer and a very clear atmosphere. Later halos are frequently seen round the sun and moon, the barometer begins to fall, and the air becomes heavy, hot, and moist. The barometer continues to fall rapidly and the wind freshens.

### **13. What is a tidal bore ?**

A tidal bore is caused where a swiftly flowing river meets the incoming tide, the result being that a high crested wave is formed. An instance of a bore is seen in the River Severn, and a modified form is also met with in the estuary of the Humber. A funnel-shaped opening compresses the wave as it moves onward and makes it higher. The highest bore is met with where two tidal waves meet, as in the Bay of Fundy.

### **14. How are icebergs formed ?**

Icebergs are formed by large pieces of ice breaking off the edges of the Arctic and Antarctic ice-fields.

### **15. How are the fogs over the Bank of Newfoundland accounted for ?**

These are caused by warm, moist currents of air which pass over the cold waters of the bank. The moisture condenses and forms fogs.

### **16. What are ocean currents ?**

Ocean currents are streams of water in the ocean, flowing in some particular direction. They are constant, periodical, or variable.

## *Ocean Currents—Archangel—Labrador*

### **✓ 17. How are ocean currents formed ?**

They are caused either by winds or by differences in the density of the waters of the ocean at various places. Winds constantly blowing in the same direction set the surface water drifting in the same direction. The surface water in tropical regions is heated to a greater extent than the rest of the ocean and thus becomes lighter. Consequently it is forced to the surface by the greater pressure of surrounding cold water and flows outward as warm surface currents.

**18. Archangel, which is sheltered from the Arctic Ocean, is frozen up in winter, whilst on the open ocean further to the west are ice-free stretches of coast. How is this ?**

The Gulf Stream, the effects of which are felt on the stretches of coast referred to, tempers the cold of winter considerably and prevents much ice forming along the coast in winter. The effects of the Gulf Stream are not felt at Archangel, which is thus ice-bound during the winter months.

### **19. Labrador is extremely cold. Why is this so ?**

The shores of Labrador are washed by an icy Arctic current. This causes the temperature to fall far below what it would otherwise be, considering the latitude of the country.

**20. Which ocean current is of great service to the Japanese ?**

The Kuro Siwo or "Black Stream" is to Japan what the Gulf Stream is to the countries of Western Europe. It warms the coast, and makes the temperature genial and pleasant.

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